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Editorial Board changes

We were saddened to learn of the death of Professor Lawrence Revsine in May 2007 at the age of 64. He was the John and Norma Darling Distinguished Professor of Financial Accounting at the Kellogg School of Management, Northwestern University, where he had been a faculty member since 1971. The title of his doctoral dissertation, 'Replacement cost reports to investors: a relevance analysis' indicated the subsequent flow of research publications on aspects of replacement cost income which could usefully be revisited in the current debate on measurement. His research was translated into teaching through books such as *Financial Reporting and Analysis* and he received numerous awards as an outstanding educator. We appreciate the support he gave to *Accounting and Business Research* as a member of the editorial board.

David Hatherly has retired from the editorial board. We are grateful for his advice on papers submitted for review and for his encouragement of the journal. We are pleased to welcome Alan Gregory of the University of Exeter as a new member of the editorial board.

Pauline Weetman
January 2008

Earnings quality, bankruptcy risk and future cash flows

Ali Al-Attar, Simon Hussain & Ling Yan Zuo*

Abstract—Prior research suggests that the quality of accruals may be compromised where the magnitude of accruals is abnormally high, due to the presence of errors in the accruals-estimation process (Dechow and Dichev, 2002; Richardson, 2003). A consequence of this is that abnormal accruals may not map into realised future cash flows to the extent that would normally be expected of accruals data. Indeed, the association may be insignificant if abnormal accruals consist primarily of estimation noise. Our study investigates whether abnormal accruals for UK firms provide incremental insight into future cash flows. In particular, our paper may be viewed as a development of Subramanyam (1996). We find a significant positive association between abnormal accruals and one-year-ahead operating cash flows. This provides a rationale for the pricing of abnormal accruals by the market (Subramanyam, 1996; Xie, 2001) and suggests that abnormal accruals are not merely the products of noise in the accruals-estimation process. However, our results are conditional upon the probability of one-year-ahead bankruptcy risk (Charitou et al., 2004). We also find that abnormal accruals possess small but significant explanatory power for future cash flows even when controlling for the disaggregation of accruals into individual items (Barth et al., 2001).

Key words: earnings quality; bankruptcy risk; operating cash flows; future cash flows; abnormal accruals; working capital accruals

1. Introduction

Evidence from both US and UK studies supports the hypothesis that accruals contain significant explanatory power for future cash flows, over and above that contained in current cash flow data (e.g. Barth et al., 2001; Al-Attar and Hussain, 2004). The use of accrual accounting to construct *accounting earnings* is intended to give a superior insight into future cash flows than could be gleaned from current cash flow data alone (FASB, 1978, para. 44; Beaver, 1989: 6–7). Accruals mitigate timing and mismatching problems inherent in measuring cash flows over short intervals (Dechow, 1994; Dechow et al. 1998).

However, managers may use accruals to manage earnings opportunistically and thereby adversely affect the quality of reported earnings with regard to conveying information on future cash flows.

Even in the absence of deliberate manipulation by managers, large accruals may be associated with a reduced quality of reported earnings due to increased measurement errors in managers' accruals estimates: this point has been noted in studies by Dechow and Dichev (2002), Richardson (2003), Li et al. (2003) and Bharath et al. (2004). Indeed, Dechow and Dichev (2002: 36–37, 47) hypothesise that if abnormally large accruals are associated with high levels of estimation error then such accruals will not map into realised future cash flows to the extent that would normally be expected of accruals data. However, we also know that the market considers abnormal accruals to be value-relevant (Subramanyam, 1996; Xie, 2001). Our aim is to examine whether abnormal accruals for UK firms possess significant explanatory power for future cash flows, or if they are merely noisy data with little information content. We focus on abnormal working capital accruals following Peasnell et al. (2000, 2005) and employ a test methodology used previously by Subramanyam (1996). Subramanyam decomposes accounting earnings into cash flows, normal and abnormal accruals, and examines the explanatory power of these components with regard to future cash flows using OLS regression analysis.

Evidence to support the utility of abnormal accruals comes from Xie (2001) who finds that abnormal (discretionary) accruals have value-relevance in the market place. This finding suggests either that the market is inefficient and is valuing the discretionary component of earnings, or that

abnormal accruals contain information regarding future cash flows that is not contained in reported cash flows or accruals items. Of course it must be remembered that abnormal accruals reflect a broader information set than reported accruals because the calculation of abnormal accruals usually requires time-series or cross-sectional analysis. Further evidence for the utility of abnormal accruals is found by Subramanyam (1996) who reports that abnormal accruals display a strong positive association with one-year-ahead operating cash flows, and are similarly correlated with stock returns. Subramanyam (1996: 272) notes that a possible explanation for these findings is that managers may sometimes use abnormal accruals to signal private information regarding future performance, consistent with Healy and Palepu (1993).

Methodologically, our paper develops Subramanyam's study in two ways. First, we examine the information content of abnormal accruals within a framework that allows for variations in bankruptcy risk within our sample. Several US studies have suggested that bankruptcy risk may be a contextual factor influencing the information content of current accounting data vis-à-vis future cash flows, as proxied by stock returns. Frankel (1992) finds that for those companies that have bond ratings below BBB, the relation between stock returns and cash flows is weakened. Hanna (1995) reports that the information content of cash flows is conditional on a firm's financial position assessed using the Ohlson (1980) bankruptcy probability model. Examining the relation between cash flows and cumulative abnormal returns, Hanna finds the association is insignificant for the extreme bankruptcy quintiles. Since Subramanyam models future cash flows as a function of current cash flows and accruals, it follows that the slope coefficients for these variables may interact with the level of bankruptcy risk. In particular, the slope coefficients may be reduced at higher risk levels if these prior findings hold for our data.

Our second development of Subramanyam's study is to examine the information content of abnormal accruals within a framework that controls for individual accruals items. Barth et al. (2001) and Al-Attar and Hussain (2004) report that the disaggregation of total accruals into individual items leads to significant improvements in the ex-

planatory power of current accounting data for one-year-ahead operating cash flows. It is possible that the information content released through the full disaggregation of accruals may exhaust the information content of abnormal accruals – this is an issue not examined by Subramanyam.

2. Sample and methodology

2.1. Sample

The data for this study are extracted from *Datastream* for London Stock Exchange listed UK firms for each year from 1994 to 2004, inclusive.[1] Firms in the finance sector are excluded because of differences in the components of their financial statements relative to the non-finance sector, and for consistency with prior studies.[2] We include dead firms across the test period using the special search function within *Datastream*, thus avoiding any survivorship bias within our sample. Data for dead firms represents 36% of the observations within our sample. Firms are members of the following industry sectors: mineral extraction; building and construction; chemicals; electricals; engineering; paper and packaging; food production; household goods; healthcare; pharmaceuticals; hotels and leisure; media; retailers; pubs, breweries and restaurants; business support services; IT and computing; transport; utilities. The selection criteria are that accounting data be available to estimate abnormal accruals (see below) and that each sector-year category contains no less than 10 observations. This gives a sample of 4,024 firm-year observations.

The estimation of abnormal accruals follows the approach used in studies by Peasnell, Pope and Young (2000, 2005), denoted PPY hereinafter. They use a cross-sectional version of the modified Jones model and focus on working capital accruals rather than total operating accruals. Their rationale for this focus is that systematic earnings management via the depreciation accrual is likely to have limited potential (see Beneish, 1999). We continue with this line of reasoning but generate two measures of abnormal accruals. Our first measure of abnormal accruals follows PPY directly. We estimate regression equation 1 for each combination of sector (s) and year (t) where there are 10 observations or more.[3] Following Jones (1991) and many similar studies, we deflate all variables by lagged total assets:

$$WC_{j,s,t} = \alpha_{0,s,t} + \alpha_{1,s,t}(\Delta REV_{j,s,t} - \Delta REC_{j,s,t}) + \tau_{j,s,t} \quad (1)$$

where $WC_{j,s,t}$ = working capital accruals for firm j (in sector s and year t) = the change in non-cash current assets minus the change in current liabilities; $\Delta REV_{j,s,t}$ = the change in revenues from year t-1 to t; $\Delta REC_{j,s,t}$ = the change in receivables from year t-1 to t; $\alpha_{0,s,t}$ and $\alpha_{1,s,t}$ are the model parame-

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[1] During the test period for this study, UK firms reported cash flow data under FRS 1, *Cash Flow Statements* (ASB 1991, revised 1996).

[2] Constituents: FTSE-100 (15%); FTSE Mid-250 (38%); FTSE Small Cap. (47%).

[3] Peasnell et al. (2005, footnote 9) state that they estimate two versions of this model, one following our equation 1 and another with the intercept suppressed and replaced by the reciprocal of total assets. Both generate substantially the same results.

ters estimated for sector s and year t; $\tau_{j,s,t}$ = the residual error (our abnormal accruals estimate AA1).

In this regression, the residual error (τ) is the difference between the realised value for $WC_{j,s,t}$ and the estimated or normal value. Thus, the residual error gives our first estimate of abnormal accruals, which we denote AA1. It should be noted that in some papers the ΔREC term is omitted from the regression estimation, but included when calculating the abnormal accruals value. However, Peasnell et al. note that results are materially unchanged using either approach (Peasnell et al., 2000, endnote 9).

Our second estimate of abnormal accruals takes account of the results reported by Jeter and Shivakumar (1999). They suggest that cash flows from operations may be related to accruals even in the absence of earnings management and note that studies by Rees et al. (1996), Hansen and Sarin (1996) and Shivakumar (1997) have included cash flows within the Jones model. Following their approach, we adjust the PPY estimation model thus:

$$WC_{j,s,t} = \theta_{0,s,t} + \theta_{1,s,t}.(\Delta REV_{j,s,t} - \Delta REC_{j,s,t}) \qquad (2)$$
$$+ \theta_{2,s,t}.OCF_{j,s,t} + \delta_{j,s,t}$$

where $OCF_{j,s,t}$ = cash flows from operations for firm j (in sector s and year t); $\theta_{0,s,t}$, $\theta_{1,s,t}$ and $\theta_{2,s,t}$ are the model parameters estimated for sector s and year t; $\delta_{j,s,t}$ = the residual error (our abnormal accruals estimate AA2).

Again, we use the residual error (δ) to represent abnormal accruals. This gives us a cash flow-adjusted version of the PPY model, and a second measure of abnormal accruals, denoted AA2.[4]

The use of a cross-sectional regression estimation method implies that each sector-year has a mean abnormal accrual value of zero. Essentially, by choosing this approach we are comparing each actual observation to the expected value derived from a regression model for the sector-year category to which the observation belongs. These cross-sectional models assume implicitly that the model parameters are the same across all firms in the sector-year category. In theory, this could pose problems in cases where all firms within a given sector-year manipulate earnings in a similar and systematic manner. However, the main alternative to this cross-sectional sector-year approach is to estimate firm-specific models using time series data, which introduces different problems. For example, such models require the assumption of temporal stability in the model parameters and impose

restrictive survivorship requirements on a sample's constituent firms. In addition, they need to be estimated across time periods that are free of earnings manipulation, which are not easily identifiable. The sector-year approach makes no assumptions on this issue (see Jeter and Shivakumar, 1999: 301) and imposes less restrictive data requirements.

Our bankruptcy risk measure is calculated using the one-year-ahead bankruptcy probability model estimated by Charitou et al. (2004) for UK public non-financial firms. Their model takes the form:

$$\ln\left(\frac{P}{1-P}\right)_{j,t} = w_1.TLTA_{j,t} + w_2.EBITTL_{j,t} + w_3.CFOTL_{j,t} + \kappa \qquad (3)$$

where P = probability of bankruptcy one year ahead; TLTA = total liabilities $\div$ total assets; EBITTL = earnings before interest and tax $\div$ total liabilities; CFOTL = cash flows from operations $\div$ total liabilities; w = ratio weightings (w_1 = 12.38, $w_2 = -20.96$, $w_3 = -3.01$); κ = constant (-7.17).

These data are employed within a multivariate regression framework. This is discussed below.

2.2. Test methodology

Most prior UK studies on the usefulness of accounting data for explaining future cash flows have been price-based, examining price levels, returns or cumulative abnormal returns (e.g. Board and Day, 1989; Ali and Pope, 1995; Clubb, 1995; McLeay et al., 1997; Charitou and Clubb, 1999; Garrod et al., 2003). In such studies it is necessary to assume that prices reflect information about future cash flows in an efficient manner. We utilise an alternative approach by examining the ability of accounting data to explain *actual* future cash flow data.

We develop the Subramanyam model to include bankruptcy risk as an interactive variable, in conjunction with Subramanyam's three main explanatory variables (cash flows, normal accruals and abnormal accruals). Equation 4 represents our modified version of Subramanyam's model and is estimated using OLS:

$$OCF_{i,t+1} = \lambda_0 + \lambda_1 OCF_{i,t} + \lambda_2 AA_{i,t} + \lambda_3 NA_{i,t} \qquad (4)$$
$$+ \lambda_4 BR_{i,t} + \lambda_5 BR\cdot OCF_{i,t} + \lambda_6 BR\cdot AA_{i,t}$$
$$+ \lambda_7 BR\cdot NA_{i,t} + w_{i,t+1}$$

where OCF = operating cash flows; AA = abnormal accruals (for which we use two measures, AA1 and AA2 defined by equations 1 and 2); NA = normal accruals, defined as total accruals less abnormal accruals; BR = one-year-ahead bankruptcy risk, following Charitou et al. (2004); λ_0 to λ_n= model parameters, to be estimated using OLS regression; $w_{i,t+1}$ = random error term following usual OLS assumptions.

Following Subramanyam (1996) we expect the slope signs for current operating cash flows, nor-

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[4] Jeter and Shivakumar allow the coefficient θ_2 to vary across different cash flow quartiles. However, this requires the addition of five cash flow variables to the model. Given the smaller numbers of observations typically available for UK sector-year categories, we include a single variable (OCF) to control for cash flows whilst preserving degrees of freedom.

$$OCF_{i,t+1} = \gamma_0 + \gamma_1 OCF_{i,t} + \gamma_2 AP_{i,t} + \gamma_3 INV_{i,t} + \gamma_4 AR_{i,t} + \gamma_5 DEP_{i,t} + \gamma_6 OTHER_{i,t} \tag{5}$$

$$+ \sum_{m=1}^{9} \gamma_{6+m}.YEAR_m + \sum_{g=1}^{17} \gamma_{15+g}.SECTOR_g + u_{i,t+1}$$

mal accruals and abnormal accruals in equation 4 to be positive. However, if it is the case that high bankruptcy risk is associated with a diminution of the information content of current accounting data vis-à-vis future cash flows (Frankel, 1992; Hanna, 1995) then we would expect the slopes to become smaller as bankruptcy risk reaches higher levels. As a result, we hypothesise that the slopes for the multiplicative variables will be negative. We hold no *a priori* expectation for the sign of the intercept.

The methodology described above is a modified version of Subramanyam's earnings-decomposition model, which separates earnings components into operating cash flows, normal accruals and abnormal accruals. However, papers by Barth et al. (2001) and Al-Attar and Hussain (2004) propose decomposing earnings into cash flows plus individual reported accruals items (changes in accounts payable, accounts receivable and inventories, and depreciation). These papers report that such a disaggregation of earnings provides significant additional explanatory power for future cash flows, over and above current cash flows and total accruals. We examine whether abnormal accruals retain significant explanatory power once we have controlled for Barth et al.'s form of earnings disaggregation.

We begin by estimating the full Barth et al. regression model across all firm-years, using dummy variables to control for year-effects and sector-effects in the levels of future cash flows. A dummy variable approach is used here to control for sector-year variations rather than conducting individual regressions for sector-year samples because of the number of variables in the Barth et al. model and the resulting reductions in degrees of freedom for those sector-years with little more than 10 observations. Following Barth et al. we trim our sample of the extreme percentiles for each variable. Our estimated model takes the form shown above (5), where OCF = operating cash flows; AP = change in accounts payable; INV = change in inventory; AR = change in accounts receivable; DEP = depreciation on tangible assets; OTHER = represents other accruals {reported earnings − [OCF + AR + INV − AP − DEP]}; γ_0 to γ_n = model parameters, to be estimated/using OLS regression; YEAR and SECTOR are dummy variables for years and sectors; $u_{i,t+1}$ = the regression model residual.

The residual from equation 5 ($u_{i,t+1}$) represents that part of future cash flows not explained by

Barth et al.'s disaggregation procedure. We examine whether abnormal accruals possess explanatory power for this element, indicating potential incremental information content and valuation relevance. For consistency with our estimation of abnormal accruals, we conduct regression equation 5 using lagged total assets as the deflator for all variables.[5] Our model includes *m* year dummies for 1994 to 2003, with 2001 being the omitted year dummy; and *g* sector dummies, with utilities being the omitted sector dummy.[6]

To examine the potential information content of disaggregating total accruals into normal and abnormal accruals − neither of which are variables in the Barth et al. model − we use the residual from the Barth et al. model (denoted RESID) as the dependent variable in regression equation 6. As before, we allow for interaction between the explanatory variables and the level of bankruptcy risk:

$$RESID_{i,t+1} = \mu_0 + \mu_1 BR_{i,t} + \mu_2 AA_{i,t} + \mu_3 NA_{i,t} \tag{6}$$

$$+ \mu_4(BR \cdot AA_{i,t}) + \mu_5(BR \cdot NA_{i,t}) + \zeta_{i,t+1}$$

where RESID = the residual error from equation 5; AA = abnormal accruals (for which we use two measures, AA1 and AA2 defined by equations 1 and 2); NA = normal accruals, defined as total accruals less abnormal accruals; BR = one-year-ahead bankruptcy risk, following Charitou et al. (2004); μ_0 to μ_n = model parameters, to be estimated using OLS regression; $\zeta_{i,t+1}$ = random error term following usual OLS assumptions.

It is difficult *a priori* to assess the signs of the regression coefficients for the main explanatory variables, given that there is no prior evidence on these residual cash flows. Indeed, it is possible that RESID may not display any significant association with the set of explanatory variables in equation 6 if Barth et al.'s disaggregation of total accruals exhausts the information content of abnormal accruals. However, if we assume that normal and abnormal accruals convey information about residual future cash flows in a similar manner to how they convey information about future cash flows, then they will generate slopes with the same signs as for regression equation 4.

3. The results

3.1. Descriptive statistics

We begin this section by examining the sector-year regressions for equations 1 and 2, which generate our two estimates of abnormal accruals − the PPY measure (AA1) and the cash flow-adjusted PPY measure (AA2). For the sake of brevity, Table 1 reports summary data by industry sector aver-

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[5] Al-Attar and Hussain's UK study uses the number of shares as the deflator, but they state that their results are materially unaffected by using total assets as an alternative deflator.

[6] Some studies exclude utilities, but we find that our results are insensitive to this sector's inclusion/exclusion.

aged across all years, rather than for each sector-year. Values for WC, ΔREV – ΔREC and OCF are generally positive, as may be expected (Panel A). However, examination of the summary data for the regression equations displays some notable variations in the adjusted R-squared values across sectors (Panel B). This is worth noting because the regression residuals provide the estimates for abnormal accruals, and regressions with low R-squared values may tend to have a greater number of large residuals due to the inferior model-fit.

To guard against problems arising from potential outliers, the extreme 1% tails for AA1 and AA2 estimates are eliminated. It may be noted that the cash flow-adjusted PPY model often improves the degree of model-fit at the sector-year level, and this may explain why the abnormal accruals estimate AA2 displays a smaller standard deviation than AA1 (see Table 2). With regard to the regression coefficients pooled across all sector-years, we can see from Panel B of Table 1 that the average regression slope for the ΔREV – ΔREC term is positive for both regression equations, mirroring the results reported in studies by Jones (1991), Jeter and Shivakumar (1999) and Peasnell et al. (2000). The average slope for current cash flow (OCF) is negative, consistent with Dechow and Dichev's prediction and reported findings (2002: 39, 44) and the empirical evidence reported by Jeter and Shivakumar (1999: 307, Table 2, Panel B).

Table 2 presents the descriptive statistics for all the explanatory variables used in this study's regression models.

The dependent variable for regression equations

4 and 5 is future operating cash flows (OCF_{t+1}): we find positive mean and median results with little evidence of skewness. The positive averages for both current cash flows (OCF) and reported earnings (EARN) are to be expected for a representative sample of UK firms. We can see also that the mean and median values for reported earnings are less than the equivalent values for cash flows – this is consistent with prior UK evidence (Al-Attar and Hussain, 2004).

With regard to our two abnormal accruals metrics (AA1, AA2), averages are close to zero. Although these measures are residuals from OLS regression models, the mean values reported here vary slightly from zero due to the trimming of their extreme percentiles. The Pearson and Spearman correlation coefficients for our abnormal accruals metrics are reported in Table 2, Panel B, but simple bivariate correlation measures are unlikely to give us an appropriate insight into these relationships. Such correlation measures offer no controls for other variables or for the potential impact of bankruptcy risk on the magnitude of the coefficients. However, it may be noted that none of the correlation coefficients for our explanatory variables are close to unity.

3.2. Employing the Subramanyam (1996) disaggregation of total accruals

In this section we present the results for our development of Subramanyam's model, defined in equation 4. Total accruals are disaggregated into normal and abnormal accruals. The regression results for our full sample are reported in Table 3,

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Table 1
Abnormal accruals estimation data summarised by sector (across all years 1994–2004)

We estimate abnormal accruals each combination of sector (*s*) and year (*t*) where there are 10 observations or more. All variables are deflated by lagged total assets:

The *PPY model for abnormal accruals* estimation takes the form:

$$WC_{j,s,t} = \alpha_{0,s,t} + \alpha_{1,s,t}.(\Delta REV_{j,s,t} - \Delta REC_{j,s,t}) + \tau_{j,s,t}$$

where $WC_{j,s,t}$ = working capital accruals for firm *j* (in sector *s* and year *t*) = the change in non-cash current assets minus the change in current liabilities; $\Delta REV_{j,s,t}$ = the change in revenues from year *t-1* to *t*; $\Delta REC_{j,s,t}$ = the change in receivables from year *t-1* to *t*; $\alpha_{0,s,t}$ and $\alpha_{1,s,t}$ are the model parameters estimated for sector *s* and year *t*; $\tau_{j,s,t}$ = the residual error (= AA1).

The *cash flow-adjusted PPY model for abnormal accruals* estimation takes the form:

$$WC_{j,s,t} = \theta_{0,s,t} + \theta_{1,s,t}.(\Delta REV_{j,s,t} - \Delta REC_{j,s,t}) + \theta_{2,j,s,t}.OCF_{j,s,t} + \delta_{j,s,t}$$

where $OCF_{j,s,t}$ = cash flows from operations for firm *j* (in sector *s* and year *t*); $\theta_{0,s,t}$, $\theta_{1,s,t}$ and $\theta_{2,s,t}$ are the model parameters estimated for sector *s* and year *t*; $\delta_{j,s,t}$ = the residual error (= AA2).

* indicates rejection of the null hypothesis (zero slope) at the 0.05 level using a two-tailed test and t-ratios for slope estimates across sector-years.
Total number of firm-year observations: 4,024 extracted from *Datastream* for UK firms in the FTSE-100, FTSE Mid-250 and FTSE Small Cap indices.

Table 1
Abnormal accruals estimation data summarised by sector (across all years 1994–2004) (continued)

Panel A: Descriptive statistics (across all years 1994–2004)

Sector	WC			ΔREV – ΔREC			OCF			Sector-year obs. (n)		
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev
Minerals	0.049	0.018	0.137	0.102	0.052	0.266	0.141	0.118	0.120	13.700	14	1.829
Building & Construction	0.079	0.043	0.156	0.126	0.098	0.266	0.069	0.069	0.088	39.636	39	12.274
Chemicals	0.050	0.013	0.236	0.050	0.031	0.301	0.099	0.097	0.058	17.571	18	4.077
Hotels & Leisure	0.301	0.004	1.852	1.594	0.053	2.602	0.792	0.078	2.523	20.900	21	2.514
Electricals	0.066	0.039	0.221	0.111	0.076	0.380	0.097	0.104	0.126	22.500	23	7.292
Engineering	0.041	0.022	0.144	0.089	0.062	0.294	0.108	0.103	0.075	46.200	46	10.570
Paper & Packaging	0.068	0.034	0.118	0.120	0.091	0.264	0.139	0.118	0.121	14.667	15	1.862
Food	0.018	0.005	0.103	0.084	0.050	0.455	0.108	0.108	0.079	22.900	24	4.228
Household Products	0.029	0.021	0.086	0.132	0.081	0.231	0.143	0.113	0.128	13.000	14	2.449
Healthcare	0.145	0.027	0.513	0.179	0.081	0.370	0.069	0.105	0.272	11.500	12	1.049
Pharmaceuticals	0.061	0.020	0.193	0.137	0.054	0.301	-0.184	-0.129	0.427	14.400	14	4.300
Media	0.097	0.035	0.276	0.178	0.085	0.653	0.112	0.097	0.144	26.900	27	2.470
Retailers	0.059	0.021	0.190	0.216	0.118	0.533	0.125	0.109	0.119	45.545	46	10.671
Pubs, Breweries & Restaurants	0.029	0.004	0.118	0.137	0.055	0.333	0.113	0.098	0.069	15.800	15	2.936
Business Support Services	0.054	0.027	0.175	0.177	0.099	0.502	0.143	0.137	0.155	33.182	36	7.414
IT & Computing	0.202	0.070	1.004	0.311	0.165	0.709	0.100	0.118	0.419	23.818	26	8.010
Transport	0.033	0.012	0.115	0.144	0.049	0.347	0.168	0.102	0.667	21.727	24	5.255
Utilities	0.017	0.006	0.060	0.069	0.024	0.194	0.109	0.094	0.091	20.000	20	3.578

Table 1
Abnormal accruals estimation data summarised by sector (across all years 1994–2004) *(continued)*

Panel B: Regression outputs (across all years 1994–2004)

Sector	Mean sector-year population	Summary (mean) sector regression output for PPY model across years 1994–2004			Summary (mean) sector regression output for cash flow-adjusted PPY model across years 1994–2004			
	n	α_0	α_1	Adj R^2	θ_0	θ_1	θ_2	Adj R^2
Minerals	13.700	0.043	0.266	0.297	0.013	0.234	0.185	0.318
Building & Construction	39.636	0.009	0.370	0.412	0.107	0.388	-0.453	0.491
Chemicals	17.571	0.109	0.401	0.291	0.010	0.422	-0.186	0.283
Hotels & Leisure	20.900	-0.022	0.187	0.900	-0.022	0.211	-0.045	0.900
Electricals	22.500	-0.033	0.373	0.405	-0.027	0.381	-0.099	0.411
Engineering	46.200	-0.026	0.267	0.338	-0.043	0.249	0.208	0.349
Paper & Packaging	14.667	0.075	0.129	0.096	-0.050	0.043	0.323	0.117
Food	22.900	-0.002	0.149	0.434	-0.009	0.144	0.077	0.432
Household Products	13.000	-0.004	0.124	0.186	-0.030	0.194	-0.217	0.246
Healthcare	11.500	0.247	0.493	0.108	0.273	0.240	-1.386	0.609
Pharmaceuticals	14.400	0.030	0.267	0.176	0.033	0.264	0.012	0.169
Media	26.900	0.030	0.188	0.212	0.034	0.192	-0.068	0.209
Retailers	45.545	-0.018	0.257	0.542	-0.032	0.271	-0.147	0.548
Pubs, Breweries & Restaurants	15.800	-0.011	0.283	0.643	-0.037	0.246	0.279	0.667
Business Support Services	33.182	0.028	0.092	0.075	0.000	0.076	0.264	0.120
IT & Computing	23.818	-0.054	0.465	0.102	0.050	0.609	-2.100	0.832
Transport	21.727	0.200	0.121	0.106	0.021	0.121	-0.005	0.102
Utilities	20.000	0.014	0.198	0.485	0.016	0.204	-0.023	0.475
Regression output pooled across all sector-years								
Mean coeff:		0.034*	0.257*	0.323	0.017*	0.249*	-0.188*	0.404
SE (coeff):		0.0067	0.0102	–	0.0063	0.0112	0.0509	–
t-value:		5.10	25.28	–	2.72	22.30	-3.69	–
Median:		0.012	0.262	0.294	0.005	0.237	-0.034	0.380

Table 2
Describing the variables employed in the regression analyses

Panel A: Descriptive statistics

- Number of observations = 3,115. This number is smaller than that reported in Table 1 because the regression analysis involves trimming of extreme percentiles and also requires the availability on one-year-ahead data for cash flows.

- All variables deflated by lagged total assets, and trimmed of their extreme percentile observations.

	Mean	Median	Std Dev	Minimum	Maximum
OCF_{t+1} [†]	0.1052	0.1006	0.0952	−0.4008	0.4713
EARN	0.0527	0.0615	0.0898	−0.5600	0.3100
OCF	0.1085	0.1026	0.0971	−0.5015	0.5190
NA1	−0.0523	−0.0439	0.1115	−0.7574	0.6215
NA2	−0.0532	−0.0449	0.1147	−0.7169	0.6377
AA1	−0.0035	−0.0071	0.0846	−0.3988	0.4380
AA2	−0.0025	−0.0057	0.0838	−0.5212	0.4506
AP	0.0160	0.0058	0.0467	−0.1005	0.3438
INV	0.0157	0.0023	0.0489	−0.1194	0.3433
AR	0.0261	0.0098	0.0698	−0.1602	0.5825
DEP	0.0497	0.0439	0.0309	0.0016	0.2082
OTHER	−0.0319	−0.0177	0.0892	−0.6431	0.3260
BR [‡]	0.2265	0.0178	0.3516	0	1

where EARN = reported earnings; OCF = Operating cash flows; AP = change in accounts payable; INV = change in inventory; AR = change in accounts receivable; DEP = depreciation on tangible assets; OTHER= represents other accruals {reported earnings − [OCF + AR + INV − AP − DEP]}; AA1 and AA2 = abnormal accruals estimates based on equations 1 and 2 in the main text; NA1 and NA2 = normal accruals defined as total accruals (reported earnings − OCF), less abnormal accruals; BR = bankruptcy risk is measured here using the one-year-ahead LOGIT model developed for UK firms by Charitou et al. (2004).

[†] This is the main dependent variable for our regression models. The skewness coefficient for this variable is − 0.135

[‡] *Upper-bounds for bankruptcy risk probability deciles:*
2.5E-06 (D1); 1.1E-04 (D2); 7.7E-04 (D3); 3.6E-03 (D4); 0.0152 (D5); 0.0501 (D6); 0.1520 (D7); 0.4544 (D8); 0.9220 (D9); 1.000 (D10).

Table 2
Describing the variables employed in the regression analyses *(continued)*

Panel B: Correlation statistics for all explanatory variables used in the regression models

- Number of observations = 3,115.
- Coefficients above (below) the diagonal are Pearson (Spearman) correlations.

	EARN	OCF	NA1	NA2	AA1	AA2	AP	INV	AR	DEP	OTHER	BR
EARN		0.570*	0.278*	0.257*	0.041*	0.060*	0.084*	0.152*	0.168*	0.002	0.215*	-0.604*
OCF	0.592*		-0.335*	-0.376*	-0.100*	-0.032	0.153*	-0.032	0.084*	0.435*	-0.332*	-0.360*
NA1	0.106*	-0.341*		0.940*	-0.639*	-0.599*	-0.339*	-0.192*	-0.332*	-0.370*	0.704*	-0.181*
NA2	0.089*	-0.380*	0.943*		-0.533*	-0.657*	-0.335*	-0.157*	-0.312*	-0.386*	0.689*	-0.162*
AA1	0.048*	-0.096*	-0.588*	-0.500*		0.891*	0.360*	0.451*	0.520*	-0.009	-0.319*	0.011
AA2	0.080*	-0.023	-0.574*	-0.610*	0.896*		0.370*	0.413*	0.510*	0.026	-0.328*	-0.009
AP	0.127*	0.207*	-0.325*	-0.315*	0.328*	0.325*		0.474*	0.610*	0.099*	-0.262*	0.035
INV	0.228*	0.053*	-0.138*	-0.126*	0.383*	0.368*	0.482*		0.307*	-0.034	-0.365*	-0.099*
AR	0.209*	0.114*	-0.301*	-0.280*	0.497*	0.482*	0.567*	0.403*		0.101*	-0.519*	-0.001
DEP	0.117*	0.489*	-0.401*	-0.413*	-0.014	0.030	0.104*	0.010	0.113*		-0.134*	0.024
OTHER	0.005	-0.305*	0.616*	0.607*	-0.267*	-0.290*	-0.264*	-0.333*	-0.462*	-0.128*		-0.135*
BR	-0.646*	-0.409*	-0.134*	-0.119*	-0.013	-0.017	0.026	-0.107*	0.016	-0.012	-0.088	

* indicates significance at the 0.05 level using a two-tailed test.

Table 3
Explaining future cash flows via current cash flows and accruals

Panel A: Regression results for the full sample

$$OCF_{i,t+1} = \lambda_0 + \lambda_1 OCF_{i,t} + \lambda_2 AA_{i,t} + \lambda_3 NA_{i,t} + \lambda_4 BR_{i,t} + \lambda_5 BR \cdot OCF_{i,t} + \lambda_6 BR \cdot AA_{i,t} + \lambda_7 BR \cdot NA_{i,t} + w_{i,t+1}$$

where OCF = operating cash flows; AA = abnormal accruals (for which we use two measures, AA1 and AA2 defined by equations 1 and 2); NA = normal accruals, defined as total accruals less abnormal accruals; BR = one-year-ahead bankruptcy risk, following Charitou et al. (2004); λ_0 to λ_n = model parameters, to be estimated using OLS regression; $w_{i,t+1}$ = random error term following usual OLS assumptions. All variables deflated by lagged total assets.

H_0: slope = 0 for all variables.
H_1: slope > 0 for the variables OCF, NA, AA.
H_1: slope < 0 for the variable BR, BR·OCF, BR·NA, BR·AA.
H_1: slope ≠ 0 for the constant (intercept).

* indicates significance (rejection of null hypothesis H_0) at the 0.05 level

Dep. Variable: OCF$_{t+1}$
Adj R-sq. 0.455
Model F stat (zero slopes): 371.84*
Observations: 3,115

	Coeff.	SE	t-ratio
Intercept	0.0326	0.0030	10.93*
OCF	0.8381	0.0290	28.90*
AA1	0.3423	0.0375	9.13*
NA1	0.3836	0.0342	11.20*
BR	-0.0036	0.0055	-0.65
BR·OCF	-0.1153	0.0395	-2.92*
BR·AA1	-0.2638	0.0560	-4.71*
BR·NA1	-0.2813	0.0431	-6.52*

Dep. Variable: OCF$_{t+1}$
Adj R-sq. 0.456
Model F stat (zero slopes): 372.65*
Observations: 3,115

	Coeff.	SE	t-ratio
Intercept	0.0325	0.0030	10.93*
OCF	0.8374	0.0290	28.88*
AA2	0.3413	0.0379	9.01*
NA2	0.3766	0.0342	11.02*
BR	-0.0037	0.0054	-0.68
BR·OCF	-0.1138	0.0395	-2.89*
BR·AA2	-0.2645	0.0571	-4.63*
BR·NA2	-0.2749	0.0430	-6.39*

Table 3
Explaining future cash flows via current cash flows and accruals *(continued)*

Panel B: Regression results for the upper decile by bankruptcy risk

$$OCF_{i,t+1} = \lambda_0 + \lambda_1 OCF_{i,t} + \lambda_2 AA_{i,t} + \lambda_3 NA_{i,t} + w_{i,t+1}$$

where OCF = operating cash flows; AA = abnormal accruals (for which we use two measures, AA1 and AA2 defined by equations 1 and 2); NA = normal accruals, defined as total accruals less abnormal accruals; λ_0 to λ_n = model parameters, to be estimated using OLS regression; $w_{i,t+1}$ = random error term following usual OLS assumptions. All variables deflated by lagged total assets.

H_0: slope = 0 for all variables.
H_1: slope > 0 for the variables OCF, NA, AA.
H_1: slope ≠ 0 for the constant (intercept).

* indicates significance (rejection of null hypothesis H_0) at the 0.05 level

Dep. Variable: OCF_{t+1}

Adj R-sq. 0.524
Model F stat (zero slopes): 114.33*
Observations: 310

	Coeff.	SE	t-ratio
Intercept	0.0276	0.0070	3.93*
OCF	0.7592	0.0419	18.11*
AA1	0.0418	0.0645	0.65
NA1	0.0937	0.0392	2.39*

Dep. Variable: OCF_{t+1}

Adj R-sq. 0.524
Model F stat (zero slopes): 113.86*
Observations: 310

	Coeff.	SE	t-ratio
Intercept	0.0273	0.0070	3.87*
OCF	0.7608	0.0421	18.08*
AA2	0.0422	0.0668	0.63
NA2	0.0924	0.0391	2.36*

Panel A, with separate regressions for our two measures of abnormal accruals (AA1, AA2). The interactive variables allow us to examine whether the relationships between future cash flows and current earnings components (cash flows, normal accruals and abnormal accruals) vary with the level of one-year-ahead bankruptcy risk.

In Table 3, Panel A, it can be seen that the slope coefficients for our two measures of abnormal accruals (AA1, AA2) are positive and significant at the 0.05 level. The slopes for both current cash flows and normal accruals are also positive, consistent with Subramanyam's findings for US firms. These results provide evidence of the explanatory power of current cash flows, normal and abnormal accruals vis-à-vis future cash flows, and a rationale for the pricing of these data in the marketplace. However, the bankruptcy-interaction variables all generate negative and significant slopes. This point relates to how bankruptcy risk (BR) impacts the relationship between current accounting data and future cash flows. The significant negative slopes for the multiplicative variables in equation 4 indicate that the strong positive associations observed for OCF, NA and AA become notably reduced at higher levels of bankruptcy risk.

We investigate this issue further by re-estimating regression equation 4 for individual bankruptcy risk deciles.[7] Our investigations reveal that there is a breakdown in the association between abnormal accruals and future cash flows for the upper decile of risky firms: these results are presented in Table 3, Panel B. While the regression slopes for our abnormal accruals estimates (AA1, AA2) remain positive, they are no longer significant even at the 0.10 level.

We find that although coefficients for OCF, NA and AA retain their positive signs, they are all smaller for firms in this decile than for the main sample (see Table 3, Panel A). This makes sense given that the relationship between the three independent variables and future cash flows depends not only on their own respective slope coefficients (all positive in Panel A), but also on the coefficient for each respective interactive variable (all negative in Panel A). For example, a unit change in AA1 is expected to be associated with a change in future cash flows equal to $\{0.3423 - (0.2638 \cdot BR)\}$. In this decile, bankruptcy probabilities range from 0.92 to unity. If the BR variable is close to unity, the impact of the negative coefficient will be notable and the overall impact is to reduce the relationship to an insignificant level. Several recent studies suggest that firms in severe financial distress often exhibit volatile and extreme abnormal

accruals (Rosner, 2003; Butler et al., 2004); these matters are discussed further in section 3.3.

A number of untabulated results are worth noting here. Regression results for the ninth risk decile – where the probability of failure is between 0.46 and 0.92 – generate results consistent with the main body of firms (i.e. positive coefficients for current cash flows, normal and abnormal accruals). However, again the slopes for the explanatory variables are smaller than for the overall sample. For example, the coefficients for AA1 and AA2 are 0.198 and 0.205 respectively. These findings support our original decision to include the interactive variables in our model. Thus, the explanatory power of current accounting data (OCF, NA, AA) for future cash flows appears to be a declining function of bankruptcy risk.

We also examine the equivalent coefficient estimates for the lowest bankruptcy risk deciles: the slope coefficients of the three variables (OCF, NA, AA) for the lowest risk decile are all positive and significant at the 0.05 level. The null hypothesis of a zero slope is rejected at the 0.026 and 0.008 levels for AA1 and AA2, respectively. Thus, there is no evidence for the non-linear impact of bankruptcy risk reported in Hanna's price-based US study, where both the upper and lower bankruptcy risk quintiles demonstrated insignificant associations between current data and future cash flows, as proxied by stock returns.

A final point relates to sample size. A casual inspection of Table 1 shows that when estimating abnormal accruals, the numbers of observations used varies across different sector-years. A number of sector-years average 30 or more observations while other sector-years average little more than our minimum requirement of 10 observations. To assess our study's sensitivity to these differences, we conduct our main analysis on two sub-samples: one containing observations from the four most populated sectors and a second containing the remaining smaller sectors. We find that our original findings hold for both sub-samples.

3.3. Employing the Barth et al. (2001) disaggregation of total accruals

Barth et al. (2001) report that the disaggregation of total accruals into individual accruals items provides an improved insight into future cash flows: Subramanyam does not examine this dimension. We begin by estimating regression equation 5. The regression results presented in Panel A of Table 4 confirm earlier results for US data (Barth et al., 2001) and UK data (Al-Attar and Hussain, 2004), generating positive slopes for current year operating cash flows, depreciation, changes in accounts receivable and inventory, and a negative slope for changes in accounts payable. We also include dummy variables for years and sectors, though

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[7] The splitting of the sample by bankruptcy risk means that BR is implicitly controlled for each sample so the interactive variables are removed from the regressions.

these are primarily to control for year effects and industry sector effects in the level of cash flows.

It is the residuals from the Barth et al. model that will be employed here. If a large portion of future cash flows can be explained when accruals items are broken down into individual components then it is possible that the explanatory power released through this disaggregation of accruals may exhaust the information content of abnormal accruals identified in Subramanyam's study. By examining the residuals of equation 5, denoted RESID here, we can investigate whether the disaggregation of total accruals into normal and abnormal accruals reveals additional explanatory power. We would not expect total accruals to possess any significant explanatory power for RESID since equation 5 contains all accrual elements as explanatory variables. However, our aim is to look at the normal and abnormal elements of total accruals and to allow their coefficients to vary with bankruptcy risk as in equation 4. This is done through estimation of equation 6.

The results for this model are reported in Table 4, Panel B, with separate regressions for our two measures of abnormal accruals (AA1 and AA2). We find that the regression coefficients take the same signs for RESID as for future cash flows (reported in Table 3, Panel A) indicating that abnormal accruals contain explanatory power for the residual portion of future cash flows from the Barth et al. model. Normal accruals also exhibit a significant association with the residual. Of course, while the Barth et al. model controls for the explanatory power of individual accruals items it does not distinguish between normal and abnormal accruals, nor does it allow the impact of the accrual components to vary with bankruptcy risk. The low R-squared values are to be expected given that we are examining residuals where the variation explained by current cash flows and individual accruals items has already been stripped-out.

Overall, our results are supportive of Subramanyam's finding that both normal and abnormal accruals map to future cash flows, but this mapping is conditional on bankruptcy risk. Given the negative coefficients for the multiplicative variables, this positive mapping of accruals is most likely in cases of low bankruptcy risk. Thus, for healthy firms it appears that abnormal accruals are not primarily the results of noisy management estimates but instead convey useful information to the market. However, this association appears to weaken for the sub-set of high bankruptcy risk firms.

A possible explanation for this reduced information content is the greater heterogeneity of abnormal accruals in cases where firms are experiencing financial distress. Butler et al. (2004: 141, 156)

Table 4
Earnings components and residual future cash flows

Panel A: Regression of future cash flows onto current earnings components

$$OCF_{i,t+1} = \gamma_0 + \gamma_1 OCF_{i,t} + \gamma_2 AP_{i,t} + \gamma_3 INV_{i,t} + \gamma_4 AR_{i,t} + \gamma_5 DEP_{i,t} + \gamma_6 OTHER_{i,t}$$

$$+ \sum_{m=1}^{9} \gamma_{6+m} YEAR_m + \sum_{g=1}^{17} \gamma_{15+g} SECTOR_g + u_{i,t+1}$$

where OCF = Operating cash flows; AP = change in accounts payable; INV = change in inventory; AR = change in accounts receivable; DEP = depreciation on tangible assets; OTHER= represents other accruals {reported earnings − [OCF + AR + INV − AP − DEP]}; γ_0 to γ_n = model parameters, to be estimated using OLS regression. The error term $(u_{i,t+1})$ is the residual (RESID) employed in equation 6 and in Panel B of this table. All variables deflated by lagged total assets.

Sector dummies: Minerals (100); Building & Construction (210); Chemicals (232); Hotels & Leisure (242); Electricals (252); Engineering (261); Paper & Packaging (282); Food (333); Household Products (342); Healthcare (360); Pharmaceuticals (370); Media (432); Retailers (452); Pubs, Breweries & Restaurants (470); Business Support Services (481); Information Technology & Computing (487); Transport (490); Utilities (600).

Year dummies: YEAR1994 to YEAR2003.

Our model includes *m* year dummies for 1994 to 2003, with 2001 being the omitted year dummy; and g sector dummies, with utilities being the omitted sector dummy.

H_0: slope = 0 for all variables.
H_1: slope > 0 for the variables AR, INV, DEP and OCF.
H_1: slope < 0 for the variable AP.
H_1: slope ≠ 0 for the constant (intercept), OTHER, and all year and sector dummies.

* indicates significance (rejection of null hypothesis H_0) at the 0.05 level

Table 4
Earnings components and residual future cash flows *(continued)*

Panel A: Regression of future cash flows onto current earnings components *(continued)*

Dep. Variable: OCF_{t+1}

Adj R-sq. 0.489
Model F stat (zero slopes): 94.25*
Observations: 3,115

		Coeff.	*SE*	*t-ratio*
Earnings components	Intercept	0.0198	0.0070	2.83*
	OCF	0.6727	0.0163	41.28*
	AP	−0.4605	0.0379	−12.15*
	INV	0.1919	0.0322	5.96*
	AR	0.3193	0.0267	11.98*
	DEP	0.2662	0.0472	5.65*
	OTHER	0.2672	0.0187	14.28*
Sector dummies	Sector 100	0.0187	0.0088	2.14*
	Sector 210	−0.0079	0.0067	−1.18
	Sector 232	−0.0034	0.0086	−0.39
	Sector 242	0.0008	0.0076	0.10
	Sector 252	−0.0036	0.0076	−0.48
	Sector 261	0.0032	0.0064	0.50
	Sector 282	0.0074	0.0098	0.75
	Sector 333	0.0031	0.0073	0.42
	Sector 342	0.0083	0.0094	0.88
	Sector 360	0.0024	0.0107	0.22
	Sector 370	−0.0520	0.0096	−5.45*
	Sector 432	0.0061	0.0073	0.83
	Sector 452	0.0042	0.0064	0.66
	Sector 470	0.0092	0.0079	1.16
	Sector 481	0.0032	0.0068	0.46
	Sector 487	−0.0125	0.0083	−1.51
	Sector 490	0.0063	0.0074	0.85
Year dummies	Year 1994	0.0020	0.0063	0.31
	Year 1995	0.0112	0.0053	2.10*
	Year 1996	0.0168	0.0053	3.18*
	Year 1997	0.0004	0.0054	0.08
	Year 1998	−0.0009	0.0055	−0.16
	Year 1999	−0.0086	0.0056	−1.55
	Year 2000	−0.0065	0.0057	−1.13
	Year 2002	0.0051	0.0057	0.90
	Year 2003	0.0109	0.0074	1.48

Table 4
Earnings components and residual future cash flows *(continued)*

Panel B: Residual error, current cash flows and accruals

where RESID = the residuals from regression equation 5 (see Panel A); AA = abnormal accruals (for which we use two measures, AA1 and AA2 defined by equations 1 and 2); NA = normal accruals, defined as total accruals less abnormal accruals; BR = one-year-ahead bankruptcy risk, following Charitou et al. (2004); μ_0 to μ_5 = model parameters, to be estimated using OLS regression; $\zeta_{i,t+1}$ = random error term following usual OLS assumptions.

H_0: slope = 0 for all variables.
H_1: slope > 0 for the variables NA, AA.
H_1: slope < 0 for the variable BR, BR·NA, BR·AA.
H_1: slope ≠ 0 for the constant (intercept).

* indicates significance (rejection of null hypothesis H_0) at the 0.05 level

	Dep. Variable: RESID				Dep. Variable: RESID		
	Adj R-sq. 0.0108				Adj R-sq. 0.0102		
	Model F stat (zero slopes): 6.80*				Model F stat (zero slopes): 6.38*		
	Observations: 3,115				Observations: 3,115		
	Coeff.	*SE*	*t-ratio*		*Coeff.*	*SE*	*t-ratio*
Intercept	0.0041	0.0017	2.39*	Intercept	0.0040	0.0017	2.37*
BR	−0.0142	0.0044	−3.21*	BR	−0.0142	0.0044	−3.22*
AA1	0.0534	0.0244	2.19*	AA2	0.0602	0.0253	2.38*
NA1	0.0785	0.0197	3.99*	NA2	0.0732	0.0195	3.76*
BR·AA1	−0.1633	0.0466	−3.51*	BR·AA2	−0.1733	0.0483	−3.59*
BR·NA1	−0.1805	0.0319	−5.66*	BR·NA2	−0.1754	0.0317	−5.54*

report that failing firms may reduce non-cash net working capital due to liquidity constraints and engage in liquidity enhancing transactions that result in large negative accruals. Indeed, Butler et al. find that bankruptcy risk is not only associated with the sign of abnormal accruals but with the magnitude, with the largest (absolute) values being associated with failing firms. Rosner (2003: 394) hypothesises that the nature of abnormal accruals for failing firms may vary with audit opinions and reports that going-concern opinions are associated with income-decreasing accrual behaviour but income-increasing accruals occur for similar firms where no going-concern opinion is issued. Thus, among failing firms it is likely that accruals data will be more heterogeneous in nature than for healthy firms (Rosner) and that there will be a subset of failing firms with very large negative abnormal accruals (Butler et al.).

We find that, in general, there is a positive association between abnormal accruals for UK firms and one-year-ahead operating cash flows. Our findings could also be considered supportive of Subramanyam's suggestion that managers may sometimes use accruals to signal future profitability. If this is true, in the case of firms with negative abnormal accruals these results may not reflect a desire to signal future bad news but may reflect the phenomenon noted by Butler et al. (2004: 141) in which some distressed companies generate extreme negative accruals through their liquidity-enhancing activities.

4. Conclusion

This study examines the association between earnings components and future cash flows, building on Subramanyam (1996). Earnings data are decomposed into cash flows, normal accruals and abnormal (discretionary) accruals, and are then used to explain one-year-ahead cash flows within an OLS regression framework. Given that unusually large accruals are often linked to excessive estimation errors and reduced earnings quality (Dechow and Dichev, 2002; Richardson, 2003) or deliberate earnings management, it is not obvious that the market should price abnormal accruals and yet evidence for this exists (Subramanyam, 1996; Xie, 2001). A possible explanation is that abnormal accruals convey useful information regarding future cash flows. This was the conclusion of Subramanyam's US study and we have found similar results for UK firms. However, we also take account of bankruptcy risk, which has been reported to reduce the usefulness of accounting data for assessing future cash flows in several price-based studies (Frankel, 1992; Hanna, 1995).

We conclude that Subramanyam's findings hold

true for the main body of UK firms suggesting that, on average, abnormal accruals are not simply the product of noisy accruals-estimation by managers but contain useful information for market participants. The explanatory power of abnormal accruals for future cash flows declines at higher levels of bankruptcy risk and becomes insignificant for the upper decile of risky firms. Thus, with the exception of very high-risk firms, we find that there is a rationale for the market's pricing of abnormal accruals. We also examine whether the disaggregation of total accruals into individual accruals items (see Barth et al., 2001; Al-Attar and Hussain, 2004) exhausts the information content of abnormal accruals. We find this not to be the case – abnormal accruals retain a small but significant degree of explanatory power, reiterating our previous findings.

References

ASB (1991). FRS 1: *Cash Flow Statements*. London: Accounting Standards Board.

ASB (1996). FRS 1: *Cash Flow Statements (Revised)*. London: Accounting Standards Board.

Al-Attar, A. and Hussain, S. (2004). 'Corporate data and future cash flows'. *Journal of Business Finance and Accounting*, 31(7&8): 861–903.

Ali, A. and Pope, F.P. (1995). 'The incremental information content of earnings, funds flow and cash flow: the UK evidence'. *Journal of Business Finance and Accounting*, 22: 19–34.

Barth, M.E., Cram, D.P. and Nelson, K. (2001). 'Accruals and the prediction of future cash flows'. *Accounting Review*, (January): 27–58.

Beaver, W.H. (1989). *Financial Reporting: An Accounting Revolution*. (2nd edition). NJ: Prentice-Hall.

Beneish, M. (1999). 'A discussion of 'Are accruals during initial public offerings opportunistic?' *Review of Accounting Studies*, 3: 209–221.

Bharath, S.T., Sunder, J. and Sunder, S.V. (2004). 'Accounting quality and debt contracting'. *Working paper*, University of Michigan.

Board, J.L.G. and Day, J.F.S. (1989). 'The information content of cash flow figures'. *Accounting and Business Research*, 20: 3–11.

Butler, M., Leone, A.J. and Willenborg, M. (2004). 'An empirical analysis of auditor reporting and its association with abnormal accruals'. *Journal of Accounting and Economics*, 37: 139–165.

Charitou, A. and Clubb, C. (1999). 'Earnings, cash flows and security returns over long return intervals: analysis and UK evidence'. *Journal of Business Finance and Accounting*, 26: 283–312.

Charitou, A., Neophytou, E. and Charalambous, C. (2004). 'Predicting corporate failure: evidence for the UK'. *European Accounting Review*, 13(3): 465–497.

Clubb, C.D.B. (1995). 'An empirical study of the information content of accounting earnings, funds flow and cash flows in the UK'. *Journal of Business Finance and Accounting*, 22: 35–51.

Dechow, P. (1994). 'Accounting earnings and cash flows as measures of firm performance; the role of accounting accruals'. *Journal of Accounting and Economics*, 18: 3–42.

Dechow, P. and Dichev, L. (2002). 'The quality of accruals

and earnings: the role of accrual estimation errors'. *Accounting Review*, 77 (supplement): 35–59.

Dechow, P., Kothari, S.P. and Watts, R.L. (1998). 'The relations between earnings and cash flow'. *Journal of Accounting and Economics*, 25: 133–168.

FASB (1978). *Statement of Financial Accounting Concepts 1: Objectives of Financial Reporting by Business Enterprises*. Financial Accounting Standards Board.

Frankel, R. (1992). 'Accounting information and firms with low-grade bonds'. *Working paper*, Stanford University.

Garrod, N., Giner, B. and Larran, M. (2003). 'The value relevance of earnings, operating cash flow and accruals: A study on UK data'. *SA Journal of Accounting Research*, 17(1): 1–22.

Hanna, D.J. (1995). 'Financial distress and unexpected cash flows'. *Working paper*, University of Chicago.

Hansen, R. and Sarin, S. (1996). 'Is honesty the best policy? an examination of security analyst behavior around seasoned equity offerings'. *Working paper*, Virginia Polytechnic Institute and State University.

Healy, P.M. and Palepu, K.G. (1993). 'The effect of firms' financial disclosure policies on stock prices'. *Accounting Horizons*, 7: 1–11.

Jeter, D.C. and Shivakumar, L. (1999). 'Cross-sectional estimation of abnormal accruals using quarterly and annual data: effectiveness in detecting event-specific earnings management'. *Accounting and Business Research*, 29(4): 299–319.

Jones, J. (1991). 'Earnings management during import relief investigations'. *Journal of Accounting Research*, 29: 193–228.

Li, O.Z., Xie, H. and Xu, W. (2003). 'Heterogeneous valuation of accruals and trading volume'. *Working paper*, University of Notre Dame.

McLeay, S., Kassab, J. and Helan, M. (1997). 'The incremental information content of accruals: evidence based on the exponential smoothing of levels and trends in pretax earnings, funds flow and cash flow'. *Journal of Business Finance and Accounting*, 24(7 & 8): 1147–67.

Ohlson, J. (1980). 'Financial ratios and the probabilistic prediction of bankruptcy'. *Journal of Accounting Research*, (Spring): 109–131.

Peasnell, K., Pope, P. and Young, S. (2000). 'Accrual management to meet earnings targets: UK evidence pre- and post-Cadbury'. *British Accounting Review*, 32(4): 415–445.

Peasnell, K., Pope, P. and Young, S. (2005). 'Board monitoring and earnings management: do outside directors influence abnormal accruals?' *Journal of Business Finance and Accounting*, 32(7&8): 1311–1346

Rees, L., Gill, S. and Gore, R. (1996). 'Studies on recognition, measurement and disclosure issues'. *Journal of Accounting Research*, 34: 157–169.

Richardson, S. (2003). 'Earnings quality and short sellers'. *Accounting Horizons* (supplement): 49–61.

Rosner, R.L. (2003). 'Earnings manipulation in failing firms'. *Contemporary Accounting Research*, 20(2): 361–408.

Shivakumar, L. (1997). 'Earnings management around seasoned equity offerings'. *Working paper*, London Business School.

Subramanyam, K.R. (1996). 'The pricing of discretionary accruals'. *Journal of Accounting and Economics*, 22: 249–281.

Xie, H. (2001). 'The mispricing of abnormal accruals'. *Accounting Review*, 76: 357–373.

Investor relations meetings: evidence from the top 500 UK companies

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Abstract—Meetings with analysts and investors are an important part of the investor relations process. I develop a two-dimensional dynamic model of investor relations and derive five research questions about investor relations with particular emphasis on investor relations meetings. To answer the questions I obtain data in 2002 from company managers using a questionnaire survey of top UK companies. Comparative data from 1991 is used to establish whether company- or market-side change drivers have led to changes over time. A key research question seeks an explanation for the differences in level of IR activity between companies. I develop a cross-sectional model and test the model using survey data.

Key findings are that one-to-one meetings were ranked as the most important communication channel with analysts and investors both in 2002 and 1991. Companies were positive about their relationship with analysts and investors with similar perceptions to those held in 1991. An explanation of recent results, the creation of shareholder value and discussion of company strategy were rated as the most important issues discussed at IR meetings. The level of investor relations activity, as measured by the number of one-to-one meetings and audience size, had increased over the period.

A greater number of one-to-one meetings were held by companies with a higher number of institutional investors, greater analyst following, foreign listings, extreme market-to-book values and recently issued share capital. The size of the audience for investor relations meetings of all types was largely driven by company size and analyst following in respect of sell-side analysts. The existence of foreign listings was the most important explanatory variable for the size of the audience of buy-side analysts and fund managers.

Key words: investor relations; meetings; sell-side analysts; buy-side analysts; institutional investors

1. Introduction

Investor relations is a management discipline that first came to prominence in the US but which has gained increasing importance in the UK over the past two decades. Both of these countries possess significant equity markets and accounting has been oriented towards the decision making needs of investors. In both countries investor relations professionals have formed their own associations. The UK Investor Relations Society was founded in 1980. In the US the National Investor Relations Institute (NIRI), which was formed in 1969, has defined investor relations as:

'... a strategic management responsibility using the disciplines of finance, communication and marketing to manage the content and flow of

company information to financial and other constituencies to maximise relative valuation.' (NIRI, 2002)

Understanding investor relations helps in our understanding of the operation of capital markets. Rao and Sivakumar (1999) reported that the number of US Fortune 500 companies with IR departments rose from 16% to 56% in the period 1984 to 1994 and more recently Bushee and Miller (2005) commented on the lack of academic research into the investor relations process. Accordingly, they used interviews, a web-based opinion survey of interviewees and empirical testing (using data external to the firm) in their study of investor relations, firm visibility and investor following in the US.

This paper contributes to the literature by presenting, discussing and analysing results of survey research in 2002 into the practice of investor relations, especially investor relations meetings, in the UK. The survey research results contained both numerical data (allowing a cross-sectional modelling approach) and ranking scale data on perceptions of and opinions about investor relations. Both types of data enable us to explain more about investor relations in the context of the investor relations and disclosure literature and the two-dimensional model derived from the literature. A unique contribution of this paper is the availability of comparative survey data from 1991 which en-

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ables an examination of changes over time.

The paper is organised as follows: Section 2 reviews the literature relating to investor relations in general and to investor relations meetings in particular and develops a dynamic two-dimensional model placing investor relations in context in the capital markets. In Section 3 this model is used to derive the research questions. Section 4 discusses the research approach taken in this project in order to collect data about investor relations meetings. In Section 5 the results relating to the individual research questions are presented, discussed and analysed. Section 6 contains a discussion and conclusions.

2. Literature review and two-dimensional model

This review considers research into investor relations paying particular reference to the establishment of a theoretical framework within the disciplines of accountancy and finance (broadly defined). The theoretical framework is delineated by a two-dimensional model (see Figure 1) drawing on insights from the literature.

2.1. The company's disclosure position and drivers of change

Investor relations is a multi-disciplinary management function but one main theoretical approach for studying the subject has been disclosure theory. In this approach, investor relations is viewed as a method or type of disclosure. Disclosure theory research has differentiated between mandated and voluntary disclosures. Healy and Palepu (2001) identified six hypotheses relating to managers' voluntary disclosure decisions: the capital markets transaction/cost of capital hypothesis, the corporate control contest hypothesis, the stock compensation hypothesis, the litigation cost hypothesis, the management talent signalling hypothesis and the proprietary cost hypothesis. All of the above hypotheses have implications for the investor relations function. Investor relations as an activity is voluntary although much of the content of the disclosure is based on mandatory disclosures. Voluntary disclosure of additional non-mandatory information via the investor relations function has been increasingly constrained by regulations on the disclosure of price sensitive information. However, once non-mandatory information has been disclosed to the market it may be discussed and explained via the investor relations function.

A corporate disclosure strategy (Figure 1, Box 1) (see Lev, 1992 and Eccles and Mavrinac, 1995) may involve the establishment and upgrading of the investor relations function (Box 2).

Healy and Palepu (2001) discuss the importance of the credibility of voluntary disclosure. If disclosures are credible they will have market outcomes (Box 4) and an effect on variables such as stock price and may lead to analysts' forecast revisions and increased accuracy of forecasts. A competent professional investor relations function may be used to enhance the credibility of company disclosure.

A framework for the management of corporate disclosure was developed by Gibbins et al. (1990). Their findings indicated that a firm's readiness to disclose is a function of its developed 'disclosure position' (Box 1). This can be considered in terms of 'ritualism', 'opportunism' and 'antecedents'. Ritualism is defined as a relatively stable preference for the way disclosure is managed so firms tend to adhere to prescribed norms of disclosure. Opportunism is the propensity to seek firm specific advantages in the disclosure of information. Internal antecedents include the firm's history of disclosure, corporate strategy and corporate politics. External antecedents include rules, industry norms and market position of the firm. Variables related to opportunism and antecedents change over time and act as change drivers.

Self-seeking behaviour by managers is also an issue affecting the disclosure position. Hong and Huang (2005) employed mathematical modelling to show that insiders invest resources in investor relations not necessarily to improve the share price, but to enhance the liquidity of their own block of shares.

Building on the disclosure literature and taking a qualitative grounded theory approach, Holland (2004) investigated the demand and supply side determinants of the disclosure agenda and established the central role of the value-creation 'story' in disclosure. The investor relations function can assist in crafting this story.

Rao and Sivakumar (1999) considered investor relations from the standpoint of institutional theory. They noted the 'boundary spanning' nature of investor relations and traced the rise of investor relations in the 1980s. They suggested that 'coercive pressures' from the investor rights movement would lead to the establishment of investor relations departments in US firms. Additionally pressures from financial analysts acting as professionals and watchdogs were expected to influence investor relations department formation (Figure 1, link between Box 1 and 2). 'Mimetic influences' were also expected to lead to the establishment of investor relations departments. 'Board interlocks' with prior adopters of investor relations departments and the number of adopters within the firm's industry were considered likely to lead to adoption of an investor relations department. Empirical testing of their model gave support to their hypotheses (Table 1).

Figure 1
The Investor Relations Function in context
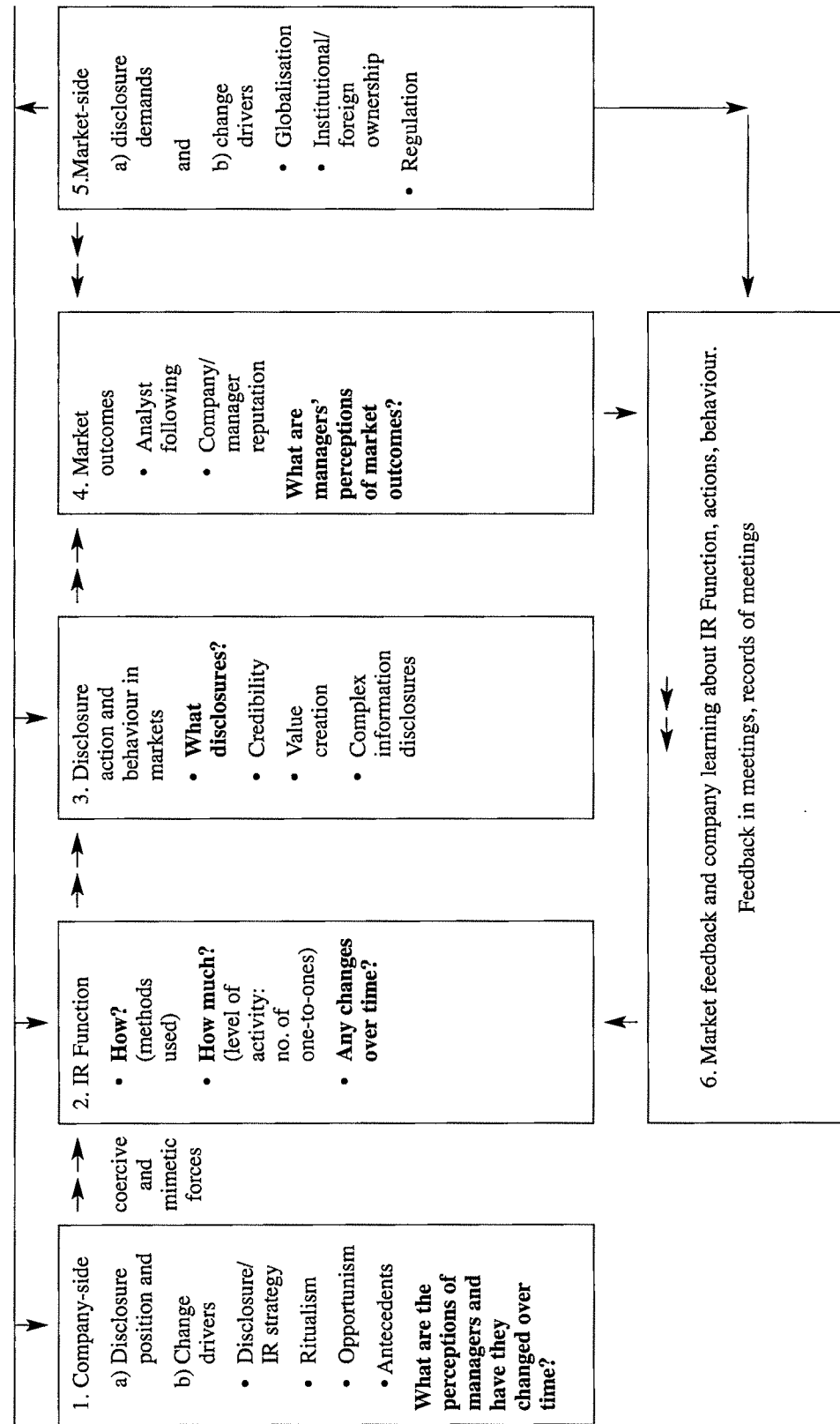
Table 1
Explanatory variables used in explaining IR actions and disclosure levels

Authors	Marston (1993)	Lang & Lundholm (1993)	Tasker (1998)	Frankel et al. (1999)	Rao & Sivakumar (1999)	Gelb (2000)	Bushee et al. (2003)
Dependent variables	Various	IR disclosure	Conference calls	Conference calls	Adoption of IR dept.	IR disclosure	Real time open access to conference calls as opposed to closed calls
Independent variables[13]							
Firm size (+)(? For B,M&M[14])	Y	Y	Y	Y	Y	Y	N
Performance – share price (+)		Y			Y	Y	
Return variability (+)	N	Mixed			Y	N	
Beta (+)	N						
Specific risk (+)	N						
Trading activity/frequency(+)	N						Y
Performance – accounting numbers (+)	N	Mixed	Y	Y & N	N		
Volatility of operating performance (–)					N		Y (opp)
Riskiness – accounting numbers/gearing (+)	N			Y N N			
Correlation between annual returns and earnings (–)		YY					
Raising of capital (+)		Y	Y (N for debt) Y (4 industry level measures)	N (Y for debt)	N		
Informativeness of financial statements (–)						Y	
Market to book (+)(– for B,M&M)	Y		Y	Y			N
Institutional ownership (+) (– for B,M&M)					N		Y
Insider ownership (+)	Y					Y marginal	Y
Ownership dispersion (+)							
Analyst following (+)(– for B,M &M)			Y	Y	Y		Y
Proprietary costs (+)			N/A (omit oligopoly from sample)	Y		N	
Industry classification/High tech (+) (– for B,M &M)	N						Y

Table 1
Explanatory variables used in explaining IR actions and disclosure levels (*continued*)

Authors	Marston (1993)	Lang & Lundholm (1993)	Tasker (1998)	Frankel et al. (1999)	Rao & Sivakumar (1999)	Gelb (2000)	Bushee et al. (2003)
CEO career concerns – age (–)			Y				
Shareholder litigation (?)			Y				
Extraordinary/unusual items in earning (+)				N N			
Anti-management resolutions (+)					Y		
Board interlocks with prior adopters of IR Depts. (+)					Y		
No. of adopters of IR Depts. in industry (+)					N		
Time trend measure (+)					Y		
Centrality (+)					Y Marginal		
Industry level ERC R square (+)							Y Marginal
Intangibles (–)							Y
Firm Age (?)							N
Takeover activity (+)	N						
Employees (stakeholders) (+)							N
Foreign listing (+)	Y						

Y= indicates a significant result or results, N = not significant, opp. = in opposite direction to that hypothesised, use of more than one proxy indicated by Y Y etc.[15]

[13] Expected direction of effect in brackets.
[14] B,M&M is Bushee Matsumoto & Miller (2003). The different expected direction of relationship in some cases is related to the nature of the dependent variable.
[15] A more detailed version of this summary can be obtained from the corresponding author.

2.2. Explanations for disclosure actions of the investor relations function

Several studies (Marston, 1993; Lang and Lundholm, 1993; Tasker, 1998; Frankel et al., 1999; Gelb, 2000; Bushee et al., 2003) have attempted to explain investor relations activity and disclosure (Box 3). The studies make use of various theories and hypotheses discussed by Myers (1977), Diamond (1985), Verrecchia (1990), Lev and Penman (1990), Healy and Palepu (2001), Skinner (1995) and Lev (1996). Each study takes a different approach and most of them also refer to prior empirical studies (e.g. Clarkson et al., 1994; Ruland et al., 1990; Frankel, et al., 1995; in creating their model. Table 1 illustrates the wide diversity of dependent and explanatory variables used (with up to 13 in one model) and results obtained.

Bushee et al. (2003) consider that the existence of 'complex information disclosures' means that companies will hold closed conference calls with experts rather than open calls. The idea that 'complex information disclosures' drive the need for investor relations disclosure or a particular type of investor relations disclosure is reflected in many of the other models. For example, Tasker (1998) looks at whether less informative financial statements lead to a need for conference calls and uses industry level market-to-book as one proxy for this. Size itself, although often relegated to the role of a control variable, can also be viewed as a proxy for complexity. The existence of complex information disclosures is likely to exacerbate information asymmetry and this is reflected in the models that include intangibles or market to book values.

Table 1 provides evidence that differing levels of investor relations activity/disclosures can be explained by disclosure and institutional theories although the evidence is mixed and theoretical approaches differ between authors. The measures of investor relations activity in these studies (apart from Marston, 1993) are obtained by external observation to the firm and this provides a motivation for further investigation of internally provided measures in the light of new theoretical perspectives.

2.3. Studies testing whether investor relations has any effect/market outcome

Investor relations disclosures, if they are credible, should have an effect or market outcome (Figure 1, Box 4) of some kind. Brennan and Tamarowski (2000) argue that a firm's information disclosure policy should enable it to influence the extent of analyst following. They also note that 'a firm's disclosure policy is perhaps the most significant aspect of its investor relations management'. They review the literature relating to investor relations, liquidity and stock prices. Their review shows that investor relations activities reduce the cost of information to analysts and lead to a greater analyst following. Their empirical evidence shows that analyst following increases a stock's liquidity in the US. Thus by an indirect route they demonstrate an effect for investor relations.

Empirical studies by Walmsley et al. (1992), Farragher et al. (1994), Lang and Lundholm (1996), Brooks et al. (1997), Francis et al. (1997), Frankel et al. (1999), Bushee et al. (2003) and Bushee and Miller (2005) investigate the effect of various investor relations actions on several variables. Table 2 summarises the positive and negative results obtained.

On balance it appears from the above evidence that investor relations disclosures do have an effect and this implies that they are credible to participants in the capital markets. Peasnell et al. (2005) noted however that 'the market-related consequences of corporate investor relations activity remain an unresolved empirical issue.' In their study they found that low confidence in accounting credibility post Enron also damaged confidence in investor relations contrary to anecdotal evidence that good investor relations protects companies in periods of market crisis.

2.4. Market feedback and company learning

Roberts et al. (2006: 278) noted that institutional ownership in the UK has become much more concentrated than it was 20 or 30 years ago and they therefore suggested that investors have been given 'both the opportunity and the need to actively manage their relationship with companies'. They applied the theories of Foucault to suggest that meetings between companies and fund managers remind managers of their primary objective, the pursuit of shareholder value (Figure 1, Box 6). Their analysis pursued the 'theme of meetings as an exercise of discretionary power' and developed Rao and Sivakumar's (1999) ideas.

Holland (2006: 82) also stresses the importance of market feedback in his model of corporate and market interaction. Non-observable stock market outcomes can be inferred from an active dialogue with market participants (Holland 2006: 118).

2.5 Company- and market-side change drivers

The two-dimensional model outlined in Figure 1 is a necessarily simplified attempt to encapsulate previous research contributions about the context of investor relations. The linking arrows between the boxes can represent different functional forms of relationships. There might be a monotonic relationship between more disclosure (Box 3) and analyst following (Box 4) whereas other relationships could be more complex and less amenable to being expressed mathematically. The relationships are influenced over time by change drivers (Boxes 1 and 5). The investor relations function in Box 2

Table 2
Effect of IR actions and disclosure levels on the market

Authors	Walmsley et al. (1992)	Farragher et al. (1994)	Lang and Lundholm (1996)	Brooks et al. (1997)	Francis et al. (1997)	Frankel et al. (1999)	Bushee et al. (2003)	Bushee & Miller (2005)
Independent variable	Company/ analyst meetings[16]	IR quality	Informativeness of firm's disclosures (including IR)	CEO presentations	Analyst presentations	Conference calls	Real time access to conference calls as opposed to closed calls	Hiring an IR firm
Dependent variables								
Abnormal returns (+)					Y			
Variance of abnormal returns (+)	Y							
Volatility of returns (+)						Y	YY	
Increase in small trades (+)							Y	
Trading volume/activity (+)			Y	N	Y	Y	N	YY
Analyst following (+)					Y			Y
Forecasting activity (+)								
Dispersion of analysts' forecasts (−)		Y	Y		N			
Accuracy of analysts' forecasts (+)		N	Y		N			
Bias in analysts forecasts (−)					N			
Volatility in forecast revisions (−)			Y					
Investor base (+)				N				
Trading costs (−)				N				
Institutional ownership (+)								YY
Disclosure and press coverage (+)								YY
Market value/Book to price (−)								Y

Y= indicates a significant result or results, N = not significant

[16] organised by UK Society of Investment Analysts.

mediates the relationship between company-side change drivers (Box 1) and disclosure actions. In respect of market-side change drivers the arrow along the top of Figure 1 shows how feedback may occur directly. For example new regulation will cause the company to change disclosure and a new disclosure position will become established. By a less direct route globalisation will lead to market outcomes (Box 4) and the company will learn and adapt (Box 6). The arrows in Figure 1 illustrate only the main expected linkages to avoid complication.

The literature has provided evidence that investor relations activity has changed over time with the establishment of investor relations departments (Rao and Sivakumar, 1999) and greater use of conference calls (Tasker, 1998 and Bushee et al., 2003). I expect that environmental factors (market-side change drivers, Box 5b) have contributed to changes in the investor relations industry.

Globalisation has increased competition in the world's capital markets and companies wishing to market their capital internationally perceive the need to professionalise and enhance their investor relations efforts. (See, for example, Gray (2000) who discussed the need for US companies to market their stocks to European investors and Holland's (2004: 68) discussion of the internationalisation of the market for information.) Stulz (1999: 24) noted that globalisation of capital markets increases the monitoring of management and hence increases firm value. This extra monitoring increases the work of the investor relations department. Yoshikawa and Gedajlovic (2002) examined whether greater exposure to global capital markets had any impact on Japanese firms' investor relations practices and found that foreign ownership and foreign listings were positively associated with investor relations.

For UK listed companies institutional ownership of shares declined from 60.1% to 49.4% over the period 1991 to 2002 but there was an increase in foreign ('rest of the world') ownership of ordinary shares from 12.8% to 32.1%. Individual ownership dropped from 19.9% to 14.3% (National Statistics, 2003: 9 Table A). This increase in foreign ownership over the period studied in this paper places increased demands on UK investor relations departments. Difficult UK stock market conditions, with a bear market in 2001 to 2003, will have stimulated some companies into trying harder with their investor relations efforts whereas other companies will have made a strategic decision not to invest more effort in investor relations until conditions improved.

Increased amounts of rules and regulations will have enabled investor relations departments to argue for greater resources to deal effectively with the additional requirements. Changes in the regu-

latory environment will have caused companies' investor relations departments to adopt new practices, such as more extensive recording of private disclosures (see results section later) or live web casting of results presentations.

At the individual company level there are many potential change drivers. The general environmental factors mentioned above will have affected some companies more than others (Bushee and Miller, 2005: 18). For example, during the dot.com boom 'old economy' companies may have decided to invest more in investor relations if they felt the market was undervaluing their stocks during the bubble period (see Holland 2006: 112–114). Additionally, variables identified in Table 1 will have influenced some companies' investor relations efforts more than others'. Company managers are also change drivers because they are responsible for disclosure strategy, and for any changes in investor relations, as discussed by Lev (1992) and Gibbins et al. (1990).

The availability of company data at two points in time enables the effect of change drivers on investor relations activity levels and perceptions about investor relations to be assessed in this paper. However it is outside the scope of this project to measure change drivers or to establish statistical relationships between measures of change drivers and company investor relations data.

2.6. Motivation for exploring the two-dimensional model

Bushee and Miller (2005) noted the widespread use of investor relations and the large costs incurred. They also commented that little academic research has focused on the investor relations process and stated that there was a paucity of discussion of the complete investor relations process in the literature. Notwithstanding their comment, in the UK qualitative research on investor relations meetings had been carried out by Holland (1997, 1998), Marston (1999) and Roberts et al. (2006). This paper provides a new contribution by describing and analysing investor relations meetings in the context of the whole investor relations process. It updates prior work in the UK and draws on theoretical understandings that have been developed by a number of authors in recent years.

The quantitative models discussed in the literature review are not sophisticated in terms of delineating the details of the relationships between variables. Most of the literature explaining investor relations (Figure 1, Box 3) suggests that something (e.g. adoption of an investor relations department) will happen if certain factors are in place or that there will be a positive or negative association between certain variables and investor relations variables. It is also possible that extreme values (high and/or low) of a variable may be as-

sociated with an effect on an investor relations variable (giving a U-shaped or step function relationship rather than a montonic one (Gelb 2000: 181). There are also some findings showing that company variables are associated with changes in investor relations disclosure scores (Lang and Lundholm, 1993: 266). The papers reviewed in Tables 1 and 2 contain some results inconsistent with theory and differing results according to model specification. The qualitative approaches taken by Holland (2004) and Roberts et al. (2006) attempt to deal with complexities involved in human interaction. A perfect theory that can explain and predict exactly how individual companies implement investor relations, what they communicate, the level of investor relations activity and how changes will occur over time in response to change drivers is not likely to be achieved because of the complexities outlined in Figure 1. This study aims to offer an improved insight informed both by the positive theory approach, empirical results arising from hypothesis testing and the qualitative research agenda. Accordingly, the study presents data about the investor relations process, activity levels and perceptions of investor relations, explains this data in the context of the two-dimensional model and models the investor relations activity levels using a regression model.

3. The research questions and hypotheses

Having constructed the two-dimensional model in Figure 1, the main research questions are: how is the investor relations function carried out, how much investor relations is carried out, how can differences between companies be explained, what are the perceptions of management about what is going on and how has the situation changed over time in response to change drivers? In more detail I state the questions as follows:

- RQ1 How does the company investor relations function operate in communicating with analysts and investors (Boxes 2 and 6) and what is the perceived relative importance of the various methods both now (Box 1a) and in the past (Box 1b)?

- RQ2 What is the company management's perception of its relationship with analysts and investors (Box 1a) and in the past (Box 1b and Box 5) and what is the company management's perception of the benefits of investor relations meetings and the effect of investor relations overall (Boxes 1 and 4)?

'Market outcomes' (Box 4) have been researched empirically as documented in the literature review. For the purposes of this study company respondents' perceptions of market outcomes were ob-

tained in order to answer the research question.

- RQ3 What topics are discussed at investor relations meetings (Boxes 3 and 5) and what is the perceived relative importance of the various topics discussed both now (Box 1a) and in the past (Box 1b)?

In respect of the research questions relating to perceptions I expect from the literature review that respondents from larger companies will tend to view investor relations and its elements as being more important than respondents from smaller companies. Six out of seven of the empirical papers summarised in Table 1 found that size was a significant explanatory variable for the dependent investor relations variable in a multivariate regression model. This leads to the following question:

- RQ4 Is there an association between company size and respondents' perceptions about the importance and value of investor relations?[1]

The final question is a key question in this paper because it deals not with respondents' rating scale perceptions or yes/no variables but with numerical measures of investor relations that can only be obtained from company insiders. Prior explanatory research as detailed in Table 1 (apart from Marston, 1993) uses externally observed dichotomous measures or continuous measures of perceptions from the US Financial Analysts' Federation (FAF).

- RQ5 What is the level of investor relations activity of the company, has it changed over time and what determines the current level of activity?

Investor relations activity is defined as a latent variable representing the amount of organisational effort or resources devoted to investor relations. There are many proxies that can be used to measure investor relations activity. I use the number of one-to-one investor relations meetings held by the company and the size of the potential and actual audience attending any type of investor relations meeting (Box 2).

The empirical literature attempting to explain investor relations activity (Table 1) provided an incentive for testing a regression model of the level of investor relations activity (RQ5) as measured by the number of investor relations meetings and the size of the audience. The results demonstrated a wide variation between companies in respect of the number of investor relations meetings held and the size of the audience. (Descriptive statistics are

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[1] I acknowledge that other company specific variables are also likely to affect perceptions of company respondents. However given that perceptions are evaluated on a ranking scale which is ordinal in nature it is not proposed to attempt further analysis of the reasons for different responses.

shown later in Tables 9 and 10). Bearing in mind
the theories and findings presented in the literature
review, there were several potential variables that
might explain the observed variations in the data
and help to answer the research question. These
will now be discussed.

3.1. Ownership structure and dispersion

Ownership structure and dispersion of share-
holdings can be measured in a number of ways. In
this study I take three measures as proxies.
Dealing first with geographical dispersion, I ex-
pect that companies with foreign listings are likely
to hold more one-to-one meetings, possibly as part
of a roadshow, in order to meet the needs of for-
eign investors. Previous research has shown that
firms with international listings tend to disclose
more information, both in their annual reports and
by other means, than firms with a domestic listing
only (Ahmed and Courtis, 1999). It seems likely
that international listing will cause firms to put
more effort into their investor relations function.
As the US is generally held to be the world's lead-
ing capital market with the most strict regulations
it is possible that a US listing will have more effect
on disclosure than a listing elsewhere. Foreign list-
ings are likely to stimulate demand for meetings
from analysts and fund managers based in those
markets. Marston (1993: 234) found that a foreign
listing status was significantly positively associat-
ed with the number of one-to-one meetings. The
hypothesis is:

> *H1 A company's listing status (foreign rather
> than domestic only) is positively associated with
> the level of investor relations activity.*

In respect of dispersion among shareholders I ex-
pect that the total number of shareholders will not
affect the number of one-to-one meetings as these
are reserved for analysts and investing institutions.
However the level of free-float, the percentage of
shares available to be traded on the market, may
have an effect on a company's incentive to hold
one-to-one meetings. Also, if a large proportion of
the equity is in permanent ownership (possibly by
the founding family) and not available for trading
on the stock exchange there may be little point in
devoting extensive efforts to investor relations.
Thus there may be fewer one-to-one meetings and
fewer participants in such meetings when a compa-
ny has a low free-float, and a high proportion of
shares held by the board, family and associates.
Marston (1993: 234–235) found the percentage of
insider shareholdings was significantly negatively
related to the number of one-to-one meetings for
univariate tests but not for multivariate analysis.
Gelb (2000: 170) argued that managerial ownership
mitigates agency costs and therefore reduces the
need for costly accounting disclosures. He found

that lower levels of managerial ownership were as-
sociated with more highly rated disclosure in annu-
al and quarterly reports. However he did find that
investor relations disclosures were not influenced
by the level of managerial ownership.

> *H2 The level of free-float is positively associat-
> ed with the level of investor relations activity.*

> *H3 The level of insider holdings is negatively
> associated with the level of investor relations
> activity.*

3.2. Institutional ownership

Bushee et al. (2003) have argued and shown that
the percentage of institutional ownership is nega-
tively associated with real time open access to con-
ference calls as opposed to closed conference
calls. Accordingly I expect that a high level of in-
stitutional ownership will be associated with a
greater number of one-to-one meetings. Buy-side
analysts and fund managers request one-to-one
meetings as valuable discussions can take place in
these relatively private events. Companies offer
one-to-one meetings in order to attract and retain
institutional investors. Both the percentage held by
the institutions and the number of institutions in-
volved are likely to drive the number of one-to-one
meetings. A company with a high percentage held
by a small number of institutions is likely to expe-
rience a different demand for meetings than a com-
pany with a high percentage held by a large
number of institutions. Therefore I use two proxies
in the model (Bushee and Miller, 2005: 19).

> *H4 The level of institutional ownership is posi-
> tively associated with the level of investor rela-
> tions activity.*

> *H5 The number of institutional owners is posi-
> tively associated with the level of investor rela-
> tions activity.*

3.3. Analyst following

The number of sell-side analysts following a firm
is likely to be associated with an increased number
of one-to-one meetings. Tasker (1998) has shown
that higher analyst following is associated with
holding conference calls and Rao and Sivakumar
(1999) have shown that firms with higher analyst
following were more likely to establish an investor
relations department. Bushee et al. (2003) argued
and found that analyst following would be nega-
tively related to holding open access rather than
closed conference calls. Sell-side analysts are like-
ly to request one-to-one meetings in order to enable
them to (hopefully) produce superior research re-
ports and make better recommendations.

> *H6 The level of analyst following is positively
> associated with the level of investor relations
> activity.*

3.4. Complex information disclosure environment

Bushee et al. (2003) hypothesised that firms with complex information disclosures would be more likely to hold closed conference calls as opposed to open access calls. Tasker (1998) hypothesised that firms with less informative financial statements (proxied by industry market to book values) would tend to hold conference calls. Frankel et al. (1999) hypothesised that firms which were difficult to analyse (for example those with intangible assets or in a high tech industry) would be likely to hold conference calls. Following this line of reasoning I hypothesise that firms with complex disclosures will hold more one-to-one meetings to make those disclosures or explain them in more detail. A complex information disclosure environment is a latent variable that can be proxied in various ways.

Market to book value (MTBV) is a variable that could possibly indicate the need for complex disclosures via a company's investor relations. If a company has a high market value compared to the assets shown in the accounts this could indicate the presence of intangible assets which do not appear on the balance sheet, such as intellectual capital. MTBV has frequently been used to proxy for a company's growth options in the literature. As countries move from a manufacturing based economy to a services based economy it is often argued that traditional balance sheets need to be supplemented by information about intangible income generating assets (Beattie and Thomson, 2004). In order to achieve this, companies with a high MTBV may put more effort into investor relations. They may offer more one-to-one meetings and attract a larger audience for these meetings. On the other hand, a low MTBV could be due to a 'low' share price following bad news or negative market sentiment or a negative book value and this might cause companies to offer more meetings to explain the situation. Analysts who are looking for recovery stocks might be interested in attending meetings with low MTBV companies and fund managers with an investment in such companies could also be keen to find out what it going on (Marston 2004: 62). Thus the relationship may not be monotonic.

In view of the debates surrounding accounting for intangible assets I also expect that companies with recorded intangible assets on their balance sheets may need to hold more one-to-one meetings to tell their value-creation story. Additionally some industries are inherently more complex than others and in particular high tech industries (such as biotech firms) may feel the need to hold more one-to-one meetings.

Accordingly I select three measures to proxy a complex information disclosure environment.[2]

H7 The market to book value ratio is associated with the level of investor relations activity OR

H7a A high market to book value is positively associated with the level of investor relations activity

H7b A low market to book value is positively associated with the level of investor relations activity

H8 The existence of intangible assets in the balance sheet is positively associated with the level of investor relations activity

H9 Membership of a high tech industry is positively associated with the level of investor relations activity

3.5. Raising of capital

Lang and Lundholm (1993), Tasker (1998) and Gelb (2000) found the raising of capital to be significant in their models. Frankel et al. (1999) found a positive association with issuance of debt and not equity. I hypothesise that companies issuing new capital will be likely to hold more one-to-one meetings as they will need to maintain the interest and confidence of analysts and institutions to ensure that their issues are successful. Analysts and fund managers may be more likely to request meetings to discuss such activities.

H10 The raising of new capital is positively associated with the level of investor relations activity

3.6. Control variable: company size

Company size has been shown by many studies to be associated with increased disclosure (Ahmed and Courtis, 1999). The papers summarised in Table 1 indicate that it is also an important determinant of investor relations actions and disclosure levels (although Bushee et al. (2003) was an exception). Large companies have more capital to market, they have more resources available and they are under great pressure to increase transparency. It seems likely that they will devote more effort to investor relations than smaller companies. Thus they might hold more one-to-one meetings. From the point of view of the analysts and fund managers, larger companies will naturally attract their attention unless they are required to specialise in smaller companies by their employers. Size may also indicate the presence of a complex disclosure environment as larger companies tend to be more complex in structure, segmentation and the type of activities they undertake.

H11 A company's size is positively associated with the level of investor relations activity.

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[2] Bushee et al. (2003) used five proxies for complex information disclosures and Tasker (1998) used four industry measures of financial statement informativeness.

3.7. The regression model for RQ5

The model developed in the hypotheses section above can be expressed as follows: (Investor relations activity level) $= a_0 + a_1$(Ownership dispersion/structure: listing status FLIST) $+ a_2$(Ownership dispersion/structure: free float F-F%) $+ a_3$(Ownership dispersion/structure: insider holdings BFA%) $+ a_4$(Institutional ownership: percentage INST%) $+ a_5$(Institutional ownership: number of institutional owners INSTNO) $+ a_6$(Analyst following ANALYST) $+ a_7$(Complex disclosure environment: market to book value MTBV) $+ a_8$(Complex disclosure environment: intangible assets on balance sheet IA/TOTA) $+ a_8$(Complex disclosure environment: high tech industry HIGHTECH) $+ a_9$(Recent raising of new capital NEWCAP)$+ a_{10}$(Company size MKTCAP) $+ \varepsilon$

The latent dependent variable 'investor relations activity' is proxied by the number of one-to-one meetings (1-1s) and by six measures of the size of the audience for all types of investor relations meetings from the sell-side (SSA-ATT, SSA-LIST, SB-FIRMS) and the buy-side (BSA-ATT, BSA-LIST, II-FIRMS). Thus seven regressions using different proxies are carried out. Definitions of the dependent and independent variables are shown in Table 10.

4. Research method

To answer the research questions, information was needed from company managers. A postal questionnaire was sent to the top 500 UK companies in two stages. The first stage was a survey of the top 500 European companies (Marston, 2004) and this population included 143 UK companies of which 61 responded. The second stage was a survey of the top 500 UK companies but as the top 143 companies had already been surveyed in stage one the earlier results were retained.

The first stage mailing was sent to the top 500 European companies measured by market capitalisation on 4 January 2001 and, as noted above, 143 of these were British companies. The list was obtained from the Financial Times FT500 (*Financial Times*, 2001). Questionnaires were posted out in batches over a three-week period commencing on 17 January 2002. The questionnaire was addressed to the Finance Director by name where this information was available. In other cases it was addressed to the Finance Director. Follow-up letters

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[3] The FTSE100 index fell from 6,222 to 4,129 and the FTSE All Share index from 2,983 to 2,006 between January 2001 and July 2003.

[4] A t-test showed no significant difference (t, df 459 = 1.32, significance 0.5) but in view of the distributional properties of the size variable a non-parametric test was also carried out. A Mann-Whitney test (two-tailed) comparing respondents with non-respondents was significant (Z –4.244, significance .000).

and questionnaires were sent out to non-respondents in March 2002. The follow-up letters were addressed to the investor relations officer. The second stage mailing was sent to the rest of the top 500 British companies (*Financial Times*, 2001) and these questionnaires were sent out in November 2002, with follow-up letters and questionnaires in January/February 2003. Price movements in the UK stock market in the year prior to the survey and during the survey period exhibited a general downward trend[3] that may have had some effect on company respondents.

4.1. The questionnaire

The questionnaire contained eight sections covering various aspects of the investor relations process. The questionnaire design was based on Marston (1993) but was improved in order to remove ambiguities that had been noted during coding responses to the earlier project. A review of recent academic and professional publications was carried out to update the questionnaire. Further improvements were made at the pilot stage with the assistance of investor relations practitioners. The new questionnaire contained many similar questions enabling some comparisons and assessment of changes to be made over time. Additional questions related to changes in the environment (such as the Internet) in order that an updated description could be obtained and that the impact of change drivers on the investor relations activity could be measured.

4.2. Response rate

Out of the 500 UK companies in the FT Top 500 for 2001, 39 had de-listed, merged, or been taken over by the time the questionnaires were posted, giving an effective total of 461 companies eligible to respond, of which 143 replied, giving a response rate of 31%. 55% of respondents were specialist investor relations personnel although 42% of responses were from finance directors. As shown in Table 3, the responses from finance directors tended to be from the smaller companies.

Respondents were larger than non-respondents.[4] There was no statistically significant difference between the response rates from different industrial sectors.

5. Results

I now set out and discuss the results of the research questions obtained from the questionnaire responses. The discussion contains interpretations drawn from the literature review especially those relating to theory.

As discussed above, I expect some changes in investor relations to have occurred over time as a result of company-side change drivers and market-side change drivers (Figure 1). In order to investi-

Table 3
Details of respondents and response rates

| | Market Capitalisation | | | |
	Mean £m	Median £m	SD	N
Job title of respondents				
Finance Director	1,040[1]	345	1,566	59
Investor Relations Director	9,355	3,898	18,627	59
Investor Relations Officer	4,050	815	7,512	19
Other	1,425	1,620	1,066	6
Completed questionnaire	4,887	1,046	12,843	143
Refused or no answer	3,160	484	13,044	318
Population	3,696	556	12,933	461

[1] A Kruskal-Wallis test confirmed that responses from finance directors were from significantly smaller companies (significance level .000).

gate this, the results of the survey in 2002 are compared with results of an earlier survey carried out in 1991 (Marston, 1993). The population in 1991 consisted of the top 547 UK companies by market capitalisation at the time.[5]

The 1991 survey was the first academic postal questionnaire survey of investor relations carried out in the UK and this possibly explains the high response rate of 62%. The lower response rate for the recent survey in 2002 is likely due to survey fatigue being experienced by company finance directors and investor relations officers.[6]

5.1 Research question 1

Respondents were asked to rank the importance of a variety of communication channels that are typically used by investor relations departments. The results in Table 4 show that one-to-one meetings were ranked most highly with answering telephone queries second and general or group meetings third. This agrees with the rankings obtained by Marston in 1991 (Marston, 1996: 23). Additionally the median scores[7] were the same in 2002 and 1991 for the five items for which comparative data was available. The importance of private communication has also been emphasised by Holland (1997 and 1998) and Beattie (1999). Thus

it is not surprising that the rankings remain the same given that one-to-one meetings and answering telephone queries are more private than general meetings. Market-side change drivers such as increased regulation and scrutiny of company disclosures have not affected the perceptions reported in Table 4. Seven new activities were added to the survey in 2002 and these reflected the increasing use of information technology (e-mail and Internet) and included other methods that had been noted as being of importance when performing the literature review (e.g. site visits, roadshows). However the use of e-mail and the website had not supplanted the traditional communication channels. Although the use of conference calls has been studied in a US context by Tasker (1998) and Bushee et al. (2003) their perceived importance is relatively low in the UK.

Companies were asked whether they kept records of their investor relations meetings. Records were kept by the majority of the respondents for both general (79%) and one-to-one meetings (77%). In the survey in 1991 the level of record keeping for general (57%) and one-to-one meetings (49%) was lower.

The theoretical framework provides an explanation for this increase in recording. Firstly it is caused by increased regulation since 1991 (a market-side change driver) leading to a high level of awareness of the need to control and monitor private disclosures (see Marston, 1996: 5–19). Also globalisation pressures have contributed to greater investor relations professionalism. Recording meetings helps company staff to be well prepared for return visits from investors (Marston 2004: 58). This fits in with Healy and Palepu's (2001) management talent signalling hypothesis. Beattie (1999) has suggested that minutes of one-to-one

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[5] There were 337 respondents in total giving a response rate of 62%. Of these, 325 respondents identified themselves and a Z test comparing the respondents (by size) with the population was not significant. However size was not distributed normally and repeating the test using the log of the size showed a significant result (significance $p=0.032$) indicating that respondents were larger on average than the population.

[6] In comparing the results of the two surveys it is worth noting that 307 of the companies from the 1991 population were in the 2002 population and that 46 companies responded to both surveys.

[7] Not shown in Table 4.

Table 4
Importance of communication channels with analysts and investors

	Percentage of respondents						
	Not at all – not done	Minor	Moderate	High	Mean[1,2] (median)	Rank 2002	Rank 1991[3]
One-to-one meetings	0	0	6	94	3.94 (4)^	1	1
Answering telephone queries	0	6	25	69	3.62 (4) **	2	2
General meetings, i.e. meetings for delegates from different organisations	4	6	37	53	3.41 (4) *	3	3
Providing feedback on analysts' reports	1	12	39	48	3.34 (3)	4	4
Roadshows	7	14	33	46	3.18 (3) **	5	N/A
Answering e-mail queries	4	20	32	44	3.17 (3) **	6	N/A
Via Investor Relations section on website	4	17	40	39	3.15 (3) **	7	N/A
E-mailing information to those on a circulation list	9	14	47	30	2.97 (3) *	8	N/A
Site visits	9	21	37	33	2.95 (3) *	9	N/A
Conference calls	12	21	34	33	2.87 (3) **	10	N/A
Mailing information	7	35	40	18	2.70 (3)^	11	5
Web casts	33	21	26	20	2.32 (2) **	12	N/A

[1] Where: 4 = High importance; 3 = Moderate importance; 2 = Minor importance; 1 = Not at all – not done; N/A not applicable to 1991 survey.
[2] The relationship between ranking scale answers and company size is positive in all cases and significant at the following levels in a Kruskal-Wallis test: ** significant at the .01 level, * significant at the .05 level, ^ significant at the .1 level
[3] 1991 figures are based on a maximum of 325 respondents to individual questions (subject to missing values).

meetings should be placed in an electronic library. This might 'level the playing field' for all investors although Bodoff and Zhang (2003: 456) point out that there is a vast literature in accounting, finance and economics that shows the benefits of more, or more widespread, disclosure are far from straight-forward.

5.2. Research question 2

The questionnaire asked for opinions about relationships with analysts and fund managers (Table 5). Given the amount of organisational effort and management time devoted to investor relations it was considered important to establish company respondents' personal attitudes towards investor relations.

Company respondents generally considered investor relations meetings and telephone calls to be a valuable means of communication. This finding of a positive attitude towards investor relations meetings agrees with Roberts et al. (2006: 282) who found that meetings were 'grasped as an opportunity' to influence investor decision making.

The company respondents did not appear to consider themselves pressurised to reveal inside information. There has been an increasing pressure on UK companies to be very careful about selectively revealing price-sensitive inside information (Marston 1999: 4). However the responses indicated that they can manage these pressures comfortably.

There has been an ongoing debate in the UK regarding the alleged short-termist attitude of the City of London (Marsh, 1990). For this reason perceptions about short-termism were sought from company respondents. On average the respondents did feel that sell-side analysts were somewhat more short-termist than the buy-side.

The mean score for the responses to these questions were ranked in the same order as the responses to similar questions in the 1991 survey. Additionally the median scores were the same for seven out of eight of the items[8] for which comparative data was available. This is interesting in that the results show consistent respondent perceptions over a time-period in which several change drivers have been operating. For example, as noted previously, company disclosure has been subjected to closer scrutiny and regulation but this has not affected the popularity of one-to-one meetings.

Respondents were asked for opinions about investor relations meetings. Most respondents strongly agreed that meetings are important for demonstrating the quality of the management team (Table 5). It was also generally agreed that presentation skills are important and that management can receive valuable feedback at meetings. These

findings agree with the results of an interview based study in the UK by Marston (1999). Additionally Beattie (1999: xi) found that quality of management was the most highly ranked driver of company performance in a survey of information users. This finding can be related to Healy and Palepu's (2001) management talent signalling hypothesis and shows that management wished to demonstrate their quality to the market. One note of caution comes from Roberts et al. (2006: 286), who note that 'face-to-face meetings ensure that the qualities of the message and the messengers become inextricably and consequentially entwined' and 'there is no metric that reliably relates the body language of an executive to future financial performance'. Given the vast amount of published information available from companies it appears that assessment of management quality is a key reason for attending meetings. It would be difficult to report formally on management quality because intangibles like body language, personality and the interaction between members of the management team cannot easily be put into words.

To establish the perceived effect of investor relations on the market for the company's securities, respondents were asked whether they agreed with five general statements about the benefits/effects of the investor relations programme. In general there was agreement that it helps to ensure securities are fairly priced and improves market liquidity. This is in agreement with the findings of Bushee and Miller (2005). While Bushee et al. (2003) found that higher price volatility occurred during the period of conference calls, the respondents generally agreed that investor relations helped to reduce share price volatility. Respondents were generally uncertain as to whether investor relations reduced the cost of capital.

5.3 Research question 3

In order to establish what was actually discussed at meetings, respondents were presented with a long list of possible topics. This was based on a previous study (Marston, 1993) with an additional section (designated 'management issues') designed to take account of recent trends in company reporting and the business environment.

The following three tables summarise respondents' views on the importance of the provision of information on past performance (Table 6), future prospects (Table 7), and management issues (Table 8) at investor relations meetings. Topics are listed in rank order of perceived importance. Tables 6 and 7 provide comparative data in order to assess any effect of change drivers.

An explanation of recent results was considered most important of the listed items on past performance. The relative importance of the listed items was found to be exactly the same as in the

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[8] Not shown in Table 5.

Table 5
Perceptions about IR

	Mean score[1] (median)[2]	N	2002 rank	1991 rank
Relationship with sell-side analysts				
Company meetings with sell-side analysts are a valuable means of communication	4.35 (4)	139	1	1
Company telephone conversations with sell-side analysts are a valuable means of communication	4.19 (4)^	138	2	2
Sell-side analysts are important in influencing market views about my company	4.07 (4)	138	3	N/A
Sell-side analysts are too concerned with the short-term rather than the long-term prospects for the company	3.19 (3)	136	4	3/4[4]
Sell-side analysts pressurise my company for inside information	2.49 (2)	138	5	5
Relationship with buy-side analysts and fund managers/institutional investors				
Company meetings with buy-side analysts and fund managers/institutional investors are a valuable means of communication	4.70 (5)*	141	1	1
Company telephone conversations with buy-side analysts and fund managers/institutional investors are a valuable means of communication	4.27 (4)**	142	2	2
Buy-side analysts and fund managers/institutional investors are important in influencing market views about my company	3.82 (4)	141	3	N/A
Buy-side analysts and fund managers/institutional investors are too concerned with the short-term rather than the long-term prospects for the company	2.67 (2)**	138	4	3/42[2]
Buy-side analysts and fund managers/institutional investors pressurise my company for inside information	2.09 (2)	141	5	5
Opinions about investor relations meetings				
Meetings are important for demonstrating the quality of the management team	4.60 (4)*	137		
Management may sometimes obtain valuable information and feedback at meetings	4.23 (4)	138		
Presentation skills are important to the success of the meeting	4.19 (4)	136		
Benefits and effects of IR programme				
The benefits of investor relations exceed the costs	4.30 (4)**	142		
Investor relations helps to ensure that the market price of securities is fair	3.76 (4)**	139		
Investor relations helps to improve liquidity in the market for the company's securities	3.61 (4)**	142		
Investor relations helps to reduce share price volatility	3.45 (4)**	140		
Investor relations reduces the cost of capital	3.33 (3)	141		

[1] Where: Strongly agree = 5; Agree = 4; Neutral = 3; Disagree = 2; Strongly disagree = 1.
[2] The relationship between ranking scale answers and company size is significant at the following levels in a two-tailed Kruskal-Wallis test: ** significant at the .01 level, * significant at the .05 level, ^ significant at the .1 level.
[3] 1991 figures are based on a maximum of 325 respondents to individual questions (subject to missing values).
[4] The questions about the short-term were subdivided into 2 questions in the 1991 survey.

Table 6
Relative importance of provision of different types of information on past performance at meetings

Past performance	Mean score[1,2]	N	2002 rank	1991 rank
Explanation of recent results in the context of the general economic environment	3.66	138	1	1
Explanation of structure of balance sheet and gearing	3.21	134	2	2
Performance of recent acquisitions	3.19	110	3	3
Additional breakdown of published figures by line of business	3.02^	127	4	4
Explanation of accounting policies	2.72	138	5	4
Additional breakdown of published figures by geographical area	2.55*	122	6	6
Outcome of completed research and development projects	2.41	94	7	7

[1] Where: Not at all = 1, Minor importance = 2, Moderate importance = 3, High importance = 4 (Respondents who considered the listed items 'not applicable' have been omitted.)

[2] The relationship between ranking scale answers and company size is positive and significant at the following levels in a Kruskal-Wallis test: * significant at the .05 level, ^ significant at the .1 level.

1991 survey. The theoretical framework provides no prediction for ranking the topics nor any specific prediction that the mean rankings might change over time. Although the existence of change drivers had the potential to influence the results, this did not occur. The empirical studies identified in the literature review (see Table 1) indicated that good performance (measured in various ways) is linked with investor relations disclosure and the findings here confirmed the perceived importance of discussing past performance.

Respondents also had space to make additional entries about past performance, with their perceived importance. These varied widely and corresponded with items in the theoretical models predicting investor relations disclosures. They included: cash generated per segment, an exceptional event and cash conversion actions (complex information disclosures, Bushee et al., 2003), competitive positioning (Tasker, 1998 and Gelb, 2000), capital efficiency, capital expenditure and 10-year performance against an index (Tasker, 1998).

Short-term strategy, major new products and developments and long-term strategy were the most important topics relating to future prospects. These types of disclosures could be considered to be complex information disclosures following the model of Bushee et al. (2003) and therefore perhaps more suitable for discussion in a private meeting. The rankings were quite similar to those obtained in 1991 although an explanation of major new projects and developments has risen in the rankings. This indicates increased market-side pressures for more specific forward-looking information. The items listed in Table 7 are not mutually exclusive and some are more specific than others. New information about many of the items listed in Table 7 could be price-sensitive and therefore should not be issued initially at a private briefing. However companies are able to discuss and explain the items using public domain information as the basis. An 'explanation of profits forecast' is ranked as minor to moderate importance. There are regulatory problems with issuing profits forecasts in the UK. However companies can discuss the consensus forecasts produced by analysts or discuss 'ball park figures' without committing to an exact figure.

Respondents' own entries about future prospects, with their perceived importance varied widely. They included current-year earnings guidance, volume/price outlook, government spending, growth agenda and organisational culture change. The last two items listed could be considered to be complex information disclosures in line with the Bushee et al. (2003) model.

The items listed as 'management issues' (Table 8) were intended to encapsulate some of the key concerns that have been emerging in recent years. Discussions about 'creation of shareholder value' were viewed as most important here. This mirrors the findings of Roberts et al. (2006) who have remarked on the importance of shareholder value in their study of meetings with fund managers.

Although corporate governance has been a topical issue since the 1990s in the UK it appeared to be of only moderate importance for discussion in investor relations meetings. Individual compo-

Table 7
Relative importance of provision of different types of information on future prospects at meetings

Future prospects (subject, if necessary, to prior public announcement)	Mean score[1,2]	N	2002 rank	1991 rank
Company strategy in the short term (1–2 years)	3.72*	138	1	2
Explanation of major new projects and developments	3.60^	134	2	6/9
Company strategy in the long term (>2 years)	3.55**	139	3	1
Company strategy for particular segments of the business	3.47**	126	4	2
Cash flow situation	3.41**	140	5	4
Dividend policy	3.09	129	6	5
Company strategy on future acquisitions	3.07*	128	7	6
Explanation of new products	3.05	117	8	14/15
Long-term investment plans	3.05**	129	9	8
Explanation of new contracts	2.82	120	10	15/15
Current state of order book	2.77	101	11	13
Explanation of profits forecast	2.72	102	12	10/12
Company strategy on future disposals	2.70	114	13	10
Explanation of new research and development projects	2.47	91	14	19/20
Prospects of current research and development projects	2.43	90	15	18

[1] Where: Not at all = 1, Minor importance = 2, Moderate importance = 3, High importance = 4.
In the 1991 survey there were 20 listed items and five of the items in the 2002 survey were subdivided into two items in 1991. For example 'Explanation of new products' was divided into 'First announcement of new products' and 'Further explanation of new products that have already been announced'.
[2] The relationship between ranking scale answers and company size is positive and significant at the following levels in a Kruskal-Wallis test: ** significant at the .01 level, * significant at the .05 level, ^ significant at the .1 level.

nents of corporate governance that were listed (directors' remuneration, external audit and internal audit) were rated as less important than 'corporate governance generally'. This is because some investing institutions carry out their checks on corporate governance using different personnel (i.e. not the buy-side analysts and fund managers but compliance checking officers of some sort). It is also because UK companies are required to 'comply or explain' adherence to corporate governance codes. As a result of this regime, once the baseline of corporate governance has been established, there may be little need to discuss governance further at meetings.

Risk management was ranked third after 'corporate governance generally'. The issue of risk management and risk reporting had been the subject of some scrutiny by the Institute of Chartered Accountants in England and Wales (ICAEW, 1999) prior to the survey. From the point of view of the respondents it did not appear to be a very important item for discussion at investor relations meetings. Even less importance was attached to the provi-

sion of information on social and environmental issues. Companies may provide social and environmental information and even prepare a separate report but find that there is very little discussion of these matters in meetings with analysts and investors. The subordination of these topics to that of shareholder value creation is not entirely surprising despite the vast amount of effort, discussion and research devoted to social and environmental reporting over the years.

Perhaps, surprisingly, provision of information on intellectual capital was rated as even less important. Bushee et al. (2003) indicated that a complex disclosure environment, including the existence of intangibles, provides an incentive for private disclosures. However it is possible that respondents would have responded differently if the question had referred to intangible assets in more general terms.

5.4. Research question 4

In respect of the ranking scale answers, statistical tests were carried out comparing respondents'

Table 8
Relative importance of provision of different types of information on management issues at meetings

Management issues	Mean score[1,2]	N	2002 rank
Creation of shareholder value	3.39**	137	1
Corporate governance generally	2.64	135	2
Risk management	2.47	131	3
Social and environmental issues	2.40**	136	4
Intellectual capital	2.27	117	5
Directors' remuneration	2.21	134	6
Succession plans for key management positions	2.17	132	7
External audit	2.02	131	8
Internal audit	1.91	126	9

[1] Where: Not at all = 1, Minor importance = 2, Moderate importance = 3, High importance = 4.
[2] The relationship between ranking scale answers and company size is positive and significant at the following levels in a Kruskal-Wallis test: ** significant at the .01 level.

answers with company size measured as market value. The results of the tests are displayed in Tables 4, 5, 6, 7 and 8. Table 4 shows that respondents from larger companies were significantly more likely to rank the importance of 11 out of 12 of the investor relations communications channels more highly than the smaller respondents. The results are less clear-cut in the case of perceptions of the company relationship with analysts and opinions about investor relations meetings (Table 5) with only five out of 13 significant results. However it is noticeable that larger companies are significantly more in favour of telephone calls and meetings with the buy-side than are the smaller companies. Larger companies were significantly more likely to agree with the four out of five statements about the benefits/effects of investor relations. In respect of Table 6, larger companies were significantly more likely to consider provision of additional segmental information as more important than were smaller companies but there were no significant differences for the other five items listed. In respect of provision of information on future prospects (Table 7), there were seven significant results and eight items for which there was no difference between the responses of smaller and larger companies. It is notable that the seven significant results were found within the nine items ranked most important overall. Only two of the nine items relating to management issues in Table 8 were significantly more important for larger companies. Provision of information on the creation of shareholder value was ranked as more important by larger companies indicating that they are subjected to greater 'disciplinary pressures' by investors (Roberts et al., 2006). As larger companies are subjected to higher political risk, this ex-plains why they ranked social and environmental information as more important than smaller companies.

Larger companies were significantly more likely to keep records of all types of meetings. They have more resources to facilitate this and a greater incentive to avoid selective disclosure because of their greater visibility and hence political risk.

Overall there is evidence to indicate that larger companies saw investor relations as being more important than smaller companies, as was expected.

5.5 Research question 5

In order to establish the levels of investor relations activity in the respondent companies the questionnaire asked for details of the number of investor relations meetings of all types held in the past 12 months. Table 9 shows the mean number of one-to-one meetings was 77, indicating a substantial investment of time and effort. These meetings typically involve the chief executive and/or the chief finance officer along with members of the investor relations team. There had been a large increase in the number of meetings since the 1991 survey when respondents from the UK top 500 companies reported an average of 25 one-to-one meetings. This increase has been caused by market-side change drivers (Figure 1) as discussed in the literature review. The global competition for capital has led companies to offer more one-to-one meetings than previously. This is supported by the fact that 28% of respondents had a foreign listing compared to 18% in the 1991 survey (Marston 1993: 180). The demand for one-to-one meetings increased as a result of increased competition between analysts. Competitive pressures in the financial services sector increased in the period

Table 9
Investor relations activity levels: frequency of meetings and attendance levels

	Domestic market 2002 (based in your own country)	International 2002 (based abroad)	Total 2002	Total 1991
	Mean	Mean	Mean	Mean
No. of meetings in past 12 months (12m)				
One-to-one meetings 1-1s			76.8	24.7
General meetings			5.0	6.2
Site visits			3.8	N/A
Roadshows			4.8	N/A
Sell-side audience				
SSA-ATT	28.5	8.3	32.7	24.0
SSA-LIST	37.6	15.8	47.1	26.5
SB-FIRMS	19.3	3.8	23.9	17.8
Buy-side audience				
BSA-ATT	52.7	32.6	81.0	42.2
BSA-LIST	93.1	59.2	146.6	53.5
II-FIRMS	42.3	21.4	60.8	30.3

Note: The number of respondents to each requested item varied from 73 to 129.

SSA-ATT = no. of sell-side analysts attending meetings of all types in past 12m.
SSA-LIST = no. of sell-side analysts on invitation list
SB-FIRMS = no. of stock-broking firms sending representatives to meetings of all types in past 12m.
BSA-ATT = no. of buy-side analysts and fund managers/institutional investors attending meetings of all types in past 12m.
BSA-LIST = no. of buy-side analysts and fund managers/institutional investors on invitation list.
II-FIRMS = no. of institutional investor firms sending representatives to meetings of all types in past 12m.

from the early 1990s (Johansson, 2007: 8) and the performance of sell-side analysts came under increased scrutiny (Koreto, 2001).

Other market-side change drivers were the closer surveillance of companies for breaches of insider dealing law and regulations and the post-Cadbury era of corporate governance. In 1991 it was possible to grant one-to-one meetings to favoured institutional investors and analysts only (Marston, 1996: 24–26) whereas this was no longer the case in 2002. Fund managers nowadays request meetings more often as a result of the increased importance of corporate governance issues (Marston, 2004: 53). They are also required, in some cases, to meet with companies under the terms of the investment principles of the fund they work for.[9,10]

The mean number of general meetings was five and this was slightly lower than the 1991 survey. General 'set piece' meetings follow the financial calendar and relate mainly to results announcements. They may also be organised in special situations such as takeovers and mergers. There were no obvious market-side change drivers that would

have caused an increase in general meetings in the period. The mean number of site visits was 3.8 and the mean for roadshows was 4.8. Site visits involve visits to company premises by invited analysts and/or fund managers. Road-shows involve a team from a company visiting a financial centre and holding group meetings and one-to-one meetings with the aim of meeting analysts and investors who might not visit the company at its own premises. This can be useful for meeting overseas analysts and investors.

Analyst following and institutional ownership are both important to UK quoted companies. Analysts write research reports and make forecasts and offer buy, sell or hold recommendations.

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[9] As suggested by a pension fund trustee in conversation with the author. See also Marston (2004: 53).

[10] The data provided do not differentiate between meetings for the sell-side and the buy-side so it is not clear how the increased number of one-to-one meetings is divided. It was felt that asking respondents to provide two numbers rather than one would reduce the response rate to this particular question. However the later data in Table 9 does provide a breakdown between the buy-side and the sell-side audience.

Companies want analysts to follow their shares as this research helps to maintain interest among investors. In the UK the majority of shares are held by institutions so companies need to attract and retain institutional owners. Investor relations meetings are used to maintain relationships with analysts and existing and potential investors. The size of the audience measures both the success of the company's investor relations programme and the demand from the audience.

Respondents' estimates of the number of analysts and investors who were invited to and who attended meetings can be seen in Table 9. It also provides details of the number of stock-broking firms and the number of institutional investor organisations which were represented at meetings. In view of the increasing globalisation of capital markets, respondents were asked to provide a split between the domestic market (analysts based in the UK) and international market (analysts based abroad). The ratio of domestic to international varied from 1.6 to 5 for the various measures.

Table 9 shows that there were substantially more institutional representatives on the invitation list than there were sell-side analysts. However the number of sell-side analysts had doubled since 1991 and the number of buy-side analysts had almost tripled. The numbers on the domestic invitation lists exceeded the number on the international list. The numbers actually attending meetings can be seen to be smaller than the numbers on the invitation lists. Another way of measuring attendance at meetings is to look at the number of firms sending representatives to a company's investor relations meetings. Table 9 also provides this information and it reflects the same pattern as the other data.[11]

Overall the results in Table 9 show that companies were devoting substantial effort to holding meetings for quite large numbers of analysts and investors and that there has been an increased effort in the period 1991 to 2002. Market-side change drivers, as discussed above and in the literature review, provide reasons for the increases observed in the table.

In order to explain differences between companies, I use the regression model developed above. I proxy the level of investor relations activity firstly by the number of one-to-one meetings (1-1s) and subsequently by the size of the actual and potential audience for investor relations meetings (Table 9).

5.6. The variables

Descriptive statistics for the seven dependent variables are provided in Table 10. The definitions for and the statistics for the independent variables are also shown. Spearman rank correlations between the dependent variables range from a low of .336 to a high of .864 with all being significant at

the 1% level. Correlations between the independent variables are shown in Table 11. There were several fairly large and significant correlations between some of the independent variables indicating a need to test for multicollinearity in the multivariate model.

Table 11 shows the correlations between the independent and the dependent continuous variables. In respect of the dummy variables a Mann-Whitney test is used (Table 13). Bi-variate testing provides an initial indication of whether there is support for the hypotheses.

The first row of Table 12 shows significant correlations between six out of nine of the hypothesised independent variables and the dependent variable 1-1s. This provides initial support for hypotheses H3, H5, H6, H8, H10 and H11. The correlations between the other dependent variables and the independent variables provide support for hypotheses H5, H6, H10 and H11.

Table 13 provides support for hypothesis H1 as companies with foreign stock exchange listings hold a significantly higher number of one-to-ones and have a larger audience for meetings. There is less support for hypotheses H7a (HIGHMTBV) and H7b (LOWMTBV) and H9 (HIGHTECH) apart from the fact that companies with a low MTBV seem to be associated with higher values of the dependent variables with three significant results.

As there was no support for the MTBV hypothesis H7 using the continuous variable MTBV but some support for H7b it was decided to use the dummy variables in the multiple regression instead.

Table 14 shows the model for the dependent variable one-to-one meetings (1-1s). In view of the distributional properties of some of the variables a normal scores approach as suggested by Cooke (1998) was used for the continuous dependent and independent variables. Regression diagnostics showed that multicollinearity and heteroscedasticity were not a problem. The results indicate that the number of institutional investors (INSTNO), analyst following (ANALYST) and raising of capital (NEWCAP) are significant explanatory variables in the model. Comparing these results with those studies of investor relations activity reported in Table 1 it appears that institutional ownership was also significant for Tasker (1998) and Bushee et al. (2003) but not for Rao and Sivakumar (1999). Analyst following was significant for Tasker (1998), Frankel et al. (1999) and Bushee

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[11] To put this figure in context, Briton's Index (*PR Newswire*, 2003) provides a listing of stockbrokers' addresses. There are 117 addresses of UK headquarters offices and 200 branch offices. The directory lists 7,600 named analysts and executive personnel. Marston (1993: 68–72) noted that there were around 2,000–3,000 equity analysts working in the UK in 1990.

Table 10
The variables

Dependent variables	Minimum	Maximum	Mean	Median	Standard deviation	N
1-1s	2	600	76.77	50.00	78.824	128
SSA-ATT	0	170	32.69	20.00	28.821	124
SSA-LIST	3	552	47.09	25.00	73.665	117
SB-FIRMS	2	232	23.88	15.50	29.656	96
BSA-ATT	2	1000	81.04	50.00	120.987	117
BSA-LIST	5	2000	146.55	60.00	241.336	113
II-FIRMS	2	500	60.79	40.00	73.102	92
Independent variables						
F-F% (H2)	.240	1.000	.89018	1.00000	.172780	114
BFA% (H3)	0	79	3.24	0.00	9.860	141
INST% (H4)	33.7	100	79.297	81.463	11.9113	143
INSTNO (H5)	35	173	97.44	94.00	33.832	143
ANALYST (H6)	1.00	31.67	6.5745	6.0000	4.59729	141
MTBV (H7)	−405.72	46.7	−3.99	1.88	47.653	142
IA/TOTA (H8)	.00	.86	.1875	.0737	.22538	141
NEWCAP (£k) (H10)	−9000	833000	34772.71	1866.00	116197.441	139
Size						
MKTCAP (£m) (H11)	162.9	123714.4	4886.87	1045.58	12843.8478	143
Dummy variables	Dummy=1	Dummy=0				
FLIST (H1)	40	103				143
HIGHMTBV (H7)	28	114				142
LOWMTBV (H7)	114	28				142
HIGHTECH (H9)	25	118				143

1-1s = no. of one-to-one meetings in past 12m.
SSA-ATT = no. of sell-side analysts attending meetings of all types in past 12m.
SSA-LIST = no. of sell-side analysts on invitation list.
SB-FIRMS = no. of stock-broking firms sending representatives to meetings of all types in past 12m.
BSA-ATT = no. of buy-side analysts and fund managers/institutional investors attending meetings of all types in past 12m.
BSA-LIST = no. of buy-side analysts and fund managers/institutional investors on invitation list.
II-FIRMS = no. of institutional investor firms sending representatives to meetings of all types in past 12m.
F-F% = Free-float, Datastream datatype STXFF as at 31 December 2001.
BFA% = percentage of shares owned by the board, family and their associates from *Crawford's Directory of City Connections* (Crawford's, 2002).
INST% = % held by institutions with a lower cut off point of a 0.1% holding from the Citywatch database.[17]
INSTNO = The number of institutions making up INST%.
ANALYST= Analyst holding, I/B/E/S Datastream datatype F1NE, the number of estimates associated with a fiscal year 1 forecast (average for the 3 years prior to the survey).
MTBV = Market-to-book, Datastream datatype MTBV at the 31st December 2001.[18]
IA/TOTA = Intangible assets ratio, Datastream company accounts items 344 total intangibles over 392 total assets.
NEWCAP = Worldscope cash flow datatype (W04251) 'Net proceeds from sale/issue common and preferred stock' at 31/12/01.
MKTCAP = the market capitalisation in the Financial Times UK 500 (*Financial Times*, 2001).
FLIST = US listing or any foreign listing, FLIST[19] obtained from the questionnaire.
HIGHMTBV = top quintile of values of MTBV.
LOWMTBV = bottom quintile of values of MTBV.
HITECH = High tech industry, FTSE World Actuaries Sector codes aerospace and defence (21), electronic equipment (253), pharmaceuticals (48), IT hardware and software (93) and computer services (97).

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[17] Data in Citywatch is compiled at quarterly (or sometimes less frequent) intervals but on different days. Therefore data was taken at the date nearest to the first mailing of the questionnaire, usually this was within one month of the mailing date.

[18] This is the market capitalisation divided by the net tangible assets. The net tangible assets can be small or even negative leading to extreme values in some cases. Rees (1995: 94) provides a discussion of the problem of negative numbers and small divisors in the context of accounting ratios and notes that removal of outliers, transformation and use of non-parametric statistics can be used to cope with the problem. Rather than remove outliers I consider that these data items contain information and arise for genuine reasons so transformation and/or non parametric statistics are used.

[19] There were only four companies with no US listing but with other foreign listings. Thus is was not possible to test whether there was a difference between the two groups.

Table 11
Correlation Matrix (Spearman's rho)

Between independent variables	F-F% H2	BFA% H3	INST% H4	INSTNO H5	ANALYST H6	MTBV H7	IA/TOTA H8	NEWCAP H10	MKTCAP H11
F-F%	1.000	-0.73	-.004	.427**	.318**	-.071	.038	.018	.194*
BFA%		1.000	-.049	-.146	-.064	-.149	-.144	-.028	-.193*
INST%			1.00	.240**	.232**	-.135	.160	.138	.228**
INSTNO				1.00	.728***	-.037	.148	.474***	.820**
ANALYST					1.00	-.019	-.060	.309**	.693**
MTBV						1.00	.031	.150	.020
IA/TOTA							1.00	.180*	.171*
NEWCAP (£k)								1.00	.600**
MKTCAP (£m)									1.00

See Table 10 for definition of variables.

Table 12
Correlation Matrix (Spearman's rho)

	1-1s	F-F% H2	BFA% H3	INST% H4	INSTNO H5	ANALYST H6	MTBV H7	IA/TOTA H8	NEWCAP H10	MKTCAP H11
Dependent variables										
Expected direction		+	−	+	+	+	?	+	+	+
1-1s	1.000	.162	-.234**	.154	.616***	.524***	.060	.218*	.464**	.627***
SSA-ATT		.201*	-.167	.088	.636***	.665***	.018	.254**	.375***	.728***
SSA-LIST		.135	-.068	.085	.525**	.600***	-.054	.143	.388***	.642***
SB-FIRMS		.139	-.201	.028	.639***	.696***	-.116	.131	.379***	.717***
BSA-ATT		.035	-.190*	.184*	.571**	.454***	-.075	.131	.365***	.594***
BSA-LIST		.069	-.143	.106	.494***	.427***	.001	.103	.506***	.583***
II-FIRMS		.012	-.097	.109	.531**	.376***	-.136	.206*	.388***	.572***

See Table 10 for definitions of the variables.

Table 13
Summary of results of bi-variate tests of dependent variable and independent dummy variables

Dummy variable	FLIST H1	HIGHMTBV H7a	LOWMTBV H7b	HIGHTECH H9
Expected direction	+	+	+	+
Dependent variables				
1-1s	√ **	√	√	√
SSA-ATT	√ **		√	
SSA-LIST	√ **		√	
SB-FIRMS	√ **		√ ^	√
BSA-ATT	√ **	√	√	
BSA-LIST	√ **	√	√ ^	
II-FIRMS	√ **	√	√ **	√

√ relationship between the two variables is in the expected direction
** significant at the .01 level, ^ significant at the .1 level, two-tail tests

See Table 10 for definitions of the variables.

Table 14
The number of one-to-one meetings: the model using OLS regression

		Expected direction	1-1s[1]
Dependent variable			
Adjusted R Square			.470
Constant			−.253 (−.2351)*
FLIST	(H1)	+	.311 (1.766)^
F-F%[2]	(H2)	+	
BFA%	(H3)	−	−.149 (−1.659)^
INST%	(H4)	+	−.083 (−1.179)
INSTNO	(H5)	+	.267 (2.186)*
ANALYST	(H6)	+	.337 (3.055)**
HIGHMTBV	(H7)	+	.407 (2.142)*
LOWMTBV	(H7)	+	.347 (1.823)^
IA/TOTA	(H8)	+	.074 (0.861)
HIGHTECH	(H9)	+	.140 (0.715)
NEWCAP	(H10)	+	.251 (2.959)**
MKTCAP	(H11)	+	−.126 (−0.836)
Cases			123

[1] t-values in parentheses, ** significant at the .01 level,* significant at the .05 level, ^ significant at the .1 level. Dependent variables and continuous independent variables have been converted to normal scores.
[2] There were several missing values for F-F% and it was not significant in the bi-variate test nor when the full model was tested so it has been omitted.

See Table 10 for definitions of the variables.

et al. (2003). Raising of new capital was significant for Tasker (1998) and Gelb (2000) but not for Frankel et al. (1999) or Rao and Sivakumar (1999). The existence of a foreign listing is significant at the 0.1 level (in agreement with Marston, 1993, Table 1). Both the high and low MTBV dummies are significant. Tasker (1998) and Frankel et al. (1999) found MTBV to be significant whereas Bushee et al. (2003) did not. It is surprising that size is not significant although Bushee et al. (2003) had a similar result but the other six studies summarised in Table 1 found that size was significant.

The adjusted r-square is .470 and this is reasonable. It should be borne in mind that the dependent variables figure is an estimate, probably quite a rough round sum estimate, provided by the survey respondents.

Table 15 shows a summary of the results of the regression using the three dependent variables representing the audience of sell-side analysts. The adjusted r-square is higher in these models than in Table 14. Regression diagnostics indicated that multicollinearity was not a problem. The results indicate that company size (MKTCAP) and analyst following (ANALYST) are the main factors driving the size of the actual and potential audience of sell-side analysts. The ratio of intangible assets to total assets (IA/TOTA) also appears to be an important factor. There is an unexpected negative relationship between the level of institutional ownership (INST%) and the dependent variables which is only significant in one of the regressions.

Table 15 also shows a summary of the results of the regression using the three dependent variables representing the audience of buy-side analysts and institutional investors. The models are less successful in terms of goodness of fit and consistency between the results. There does appear to be support for a positive association between listing status (FLIST) and two out of three of the dependent variables and in common with the results in Table 14 size (MKTCAP) does not seem to be a significant variable.

Overall the results of the multivariate analysis indicate that different aspects of the investor relations activity level are determined by different independent variables. In particular there may be additional explanatory variables, not included in the model, which could better explain the variation in size of the buy-side audience. A further subdivision of the buy-side audience by fund type might be worth investigating. This provides an avenue for further research and it would be desirable to collect larger data sets from companies to improve the analysis. Other measures of investor relations activity level could also be developed.

6. Conclusions and discussion

This paper adds to our understanding of the investor relations process. Investor relations activities and actions are a special kind of disclosure and the literature review indicates that while there is no all-embracing theory of investor relations, a useful explanatory framework is available. I develop a two-dimensional dynamic model for investor relations that leads to several research questions (RQ1–RQ5). In order to answer these questions I use survey questionnaire data direct from company insiders collected at two points in time.

The descriptive results show that investor relations meetings (of all types) are an important part of the financial reporting and business communication package offered by companies to their institutional investors and to analysts (RQ1). One-to-one meetings are ranked as the most important investor relations communication channel in 2002 as they were in 1991 (Table 2) (RQ1).

The results show that most companies keep records for internal purposes of various types of investor relations meeting and that this record keeping has increased since 1991 (RQ1). This enables them to prepare better for future meetings and protect themselves against allegations of selective release of price sensitive information.

The results also show that company respondents are favourably inclined towards the holding of investor relations meetings and corresponding by telephone (Table 5). The comparative data shows that these opinions have remained stable over the period 1991 to 2002 (RQ2).

The respondents largely agree that investor relations meetings demonstrate the quality of the management team (Table 5) (RQ2). This is in agreement with Healy and Palepu's (2001) management-talent signalling hypothesis. However the question then arises: if investor relations meetings create an impression of high management quality does it follow that managers are actually performing well or could the impression be false? Enron was highly rated for its management before the debacle. This is an area for further research. Respondents agreed that investor relations did have a market outcome (RQ2) in terms of fairer pricing and improved market liquidity. These perceptions are broadly in agreement with empirical research into market outcomes of investor relations in the US. However there is a case for a more in-depth survey of respondents' views on specific market outcomes along with UK based empirical studies of actual market outcomes. It would be desirable to investigate the effect of the investor relations effort on variables such as analyst following and forecast accuracy as has been done in the US. To do this empirically it would be desirable to have objective, standardised measures of investor relations activity, including meetings,

Table 15
The audience for investor relations meetings of all types: summary results of the model using OLS regression

Dependent variable	Expected direction	Sell-side audience			Buy-side audience		
		SSA-ATT	SSA-LIST	SB-FIRMS	BSA-ATT	BSA-LIST	II-FIRMS
Adjusted R Square		.640	.506	.593	.342	.411	.465
		Direction of relationship and significance level[1]					
Constant		−	−	+	−	− **	− **
FLIST (H1)	+	+	+ ^	+	+	+ **	+ **
BFA% (H3)	−	−	+	−	−	−	+
INST% (H4)	+	− **	−	− **	+	−	− ^
INSTNO(H5)	+	−	− *	−	+ ^	+	+
ANALYST (H6)	+	+ **	+ **	+ **	+	+	−
HIGH-MTBV (H7)	+	−	− ^	−	+	+	+
LOWMTBV (H7)	+	−	−	+ ^	+	+	+ **
IA/TOTA (H8)	+	+ **	+ *	+	+	−	−
HIGH-TECH (H9)	+	−	−	−	+	+	+
NEWCAP (H10)	+	−	+	+	+	+ **	+
MKTCAP (H11)	+	+ **	+ **	+ **	+	+	+
Cases		119	114	92	112	109	87

See Table 10 for definitions of the variables.

[1] ** significant at the .01 level, * significant at the .05 level, ^ significant at the .1 level. Dependent variables and continuous independent variables have been converted to normal scores.

available for a large population of listed companies over a period of time.

Respondents discuss various aspect of past performance at investor relations meetings and the importance ratings of these items had remained stable over time (Table 6) (RQ 3). Discussion of future prospects includes discussion of various aspects of company strategy with similar importance ratings obtained in 2002 and 1991 (Table 7) for the different items. Thus it appears that the agenda at investor relations meetings has not changed radically over the period 1991 to 2002. Table 8 presents data new to this study and shows that creation of shareholder value was the most highly rated item of discussion from a list of topical management issues.

I find that larger companies tend to rank investor relations as being more important than smaller companies (RQ 4) in accordance with expectations based on prior empirical research.

The demand for one-to-one meetings is high and has increased since 1991 (Table 9). It appears that analysts and investors still require the personal touch and these meetings may be a response to market failure concerning the disclosure of diffi-

cult-to-articulate information.

The size of the audience invited to and attending meetings is substantial and shows an upward trend between 1991 and 2002 (Table 9). Although the financial report plays a central role in corporate communications (Holland, 1998: 264), meetings provide an opportunity for private discussions despite the regulatory issues. The ICAEW (2007) comment that 'UK shareholders are more collegial in their engagement than their US counterparts' and in particular 'the UK regulatory environment permits dialogue between boards and investors by not presuming that such dialogue represents privileged disclosure which is restricted by regulation Fair Disclosure in the US' (ICAEW, 2007: 12).

I explain the differing investor relations activity levels between companies by using a regression model derived from the literature (RQ5). I obtain seven proxies for investor relations activity level from the survey data. These measures are not available from external sources and this is a unique feature of this study. I hypothesise that ownership structure, dispersion of ownership, and institutional ownership will be positively related to the investor relations activity level. I also expect that

firms with higher analyst following, firms with a complex disclosure environment and firms that raise capital will have a higher investor relations activity level. I also control for size. The multivariate analysis tested the 11 hypotheses proposed in the regression model. It showed that the number of one-to-one meetings increased with analyst following (H6), the number of institutional investors (H5) and also with issuance of share capital (H10). Additionally foreign listings (H1) and extreme values of MTBV (H7) appeared to have some impact although this was less well-supported. Free-float (H2), insider holdings (H3), the level of institutional ownership (H4), intangible assets (H8), membership of a high-tech industry (H9) and size (H11) were not significant in the model. Thus while only five out of 11 hypotheses received support this is not inconsistent with prior studies. For example Frankel et al. (1999) found support for five out of 13 of the variables in their model.

The regression model results showed that company size (H11) and analyst following (H6) are the main explanatory factors driving the size of the audience of sell-side analysts with some support for the influence of intangible assets (H8). In respect of the audience of buy-side analysts and fund managers there was support for foreign listing (H1) being an important explanatory factor but the results indicate the need for a different model for this aspect of investor relations activity.

The availability of comparative data enables the impact of change drivers to be assessed. The results show that levels of investor relations activity as proxied by seven variables have increased over the period (RQ5) whereas opinions and perceptions have remained fairly stable over time at the aggregate level for the two populations (RQ1,2,3). Increases in the activity level variables (Table 9) range from 30% to 210% indicating steady growth rather than an order of magnitude change. The lack of drastic change might seem somewhat surprising in view of the growth of the investor relations industry as evidenced by some of the empirical studies noted in the literature review. On the other hand Gibbins et al. (1990: 130) have established that managers may adhere to norms in respect of disclosure, subject to other factors.

In this paper the statistical analysis using single equation regression takes a cross sectional approach and both intuitively and from the two-dimensional dynamic model derived from the literature review (Figure 1) I expect that changes in some of the variables could affect investor relations activity level.[12] This is another possible area for further research.

The traditional agency theory perspective on disclosure may be less applicable to 'soft' investor relations disclosures than it is to disclosure via hard copy annual reports. Although this is a mainly quantitative study I note that theorising in this area is moving forward as a result of the contributions of qualitative researchers using interviews (Holland, 1997, 1998; Roberts et al., 2006). The literature shows that sophisticated investor relations is expected to lead to benefits in capital markets. This study of investor relations meetings should provide additional insights for those working in the area of market-based accounting research and for those following the qualitative route.

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[12] Initial investigation of the percentage change in market value and the change in MTBV did not find any significant relationships with the dependent variables.

References

Ahmed, K. and Courtis, J.K. (1999). 'Associations between corporate characteristics and disclosure levels in annual reports: a meta-analysis'. British Accounting Review, 31: 36–61.

Beattie, V. (ed.) (1999). Business Reporting: The Inevitable Change?. The Institute of Chartered Accountants of Scotland, Edinburgh.

Beattie, V. and Thomson, S. J. (2004). 'A Comprehensive Analysis of Intellectual Capital Components as a Precursor to Empirical Investigation of Disclosures in Annual Reports', 8th Annual Financial Reporting and Business Communication Conference, Cardiff.

Bodoff, D. and Zhang, H. (2003). 'Corporate disclosure dissemination: when more is less'. Decision Support Systems, 35: 455–466.

Brennan, M. J. and Tamarowski, C. (2000). 'Investor relations, liquidity and stock prices'. Journal of Applied Corporate Finance, 12 (4): 26–37.

Brooks, R. M., Johnson, M. F. and Su, T. (1997). 'CEO Presentations to Financial Analysts: Much Ado About Nothing? Financial Practice and Education, Fall 1997, 7(2): 19–28.

Bushee, B. J., Matsumoto, D. A. and Miller, G. S. (2003). 'Open versus closed conference calls: the determinants and effects of broadening access to disclosure'. Journal of Accounting and Economics, 34: 149–180.

Bushee, B. J. and Miller, G. S. (2005). 'Investor Relations, Firm Visibility and Investor Following'. Working paper, January 2005.

Clarkson, P. M., Richardson, G.D. and Kao, J.L. (1994). 'The Voluntary Inclusion of Forecasts in the MD&A Section of Annual Reports'. Contemporary Accounting Research, 11: 423–461.

Cooke, T. E. (1998). 'Regression Analysis in Accounting Disclosure Studies'. Accounting and Business Research, 28 (3): 209–224.

Crawford's (2002). Directory of City Connections, Twenty-Fourth Edition. AP Information Services, London.

Diamond, D. W. (1985). 'Optimal Release of Information by the Firm'. The Journal of Finance, 40: 1071–1094.

Eccles, R. G. and Mavrinac, S. C. (1995). 'Improving the corporate disclosure process'. Sloan Management Review, 36(4): 11–25.

Farragher, E. J., Kleinman, R. T. and Bazaz, M. S. (1994). 'Do Investor Relations Make a Difference?'. The Quarterly Review of Economics and Finance, 34 (4): 403–412.

Financial Times (2001). Financial Times 500: the World's Top 500 Companies. FT Partnership Publications.

Francis, J., Hanna, J. D. and Philbrick, D. R. (1997). 'Management communications with securities analysts'. *Journal of Accounting and Economics*, 24: 363–394.

Frankel, R., McNichols, M. and Wilson, G. P. (1995). 'Discretionary Disclosure and External Financing'. *The Accounting Review*, 7(1): 135–150.

Frankel, R., Johnson, M. and Skinner, D. J. (1999). 'An empirical examination of conference calls as a voluntary disclosure medium'. *Journal of Accounting Research*, 37(1): 133–150.

Gelb, D. S. (2000). 'Managerial Ownership and Accounting Disclosures: An Empirical Study'. *Review of Quantitative Finance and Accounting*, 15: 169–185

Gibbins, M., Richardson, A. and Waterhouse, J. (1990). 'The management of Corporate Financial Disclosure: Opportunism, Ritualism, Policies and Processes'. *Journal of Accounting Research*, 28(1): 121–142.

Gray, C. L. (2000). 'Parlez-vous investor relations?'. *Financial Executive*. Jan/Feb 2000: 26–27.

Healy, P. M. and Palepu, K. G. (2001). 'Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature'. *Journal of Accounting and Economics*, 31: 405–440.

Holland, J.B. (1997). *Corporate Communications with Institutional Shareholders: Private Disclosures and Financial Reporting*. Research Committee of the Institute of Chartered Accountants of Scotland, Edinburgh.

Holland, J.B. (1998). 'Private disclosure and financial reporting'. *Accounting and Business Research*, 28: 255–269.

Holland, J.B. (2004). *Corporate Intangibles, Value Relevance and Disclosure Content*. The Institute of Chartered Accountants of Scotland, Edinburgh.

Holland, J.B. (2006). *A Model of Corporate Financial Communications*. The Institute of Chartered Accountants of Scotland, Edinburgh.

Hong, H. and Huang, M. (2005). 'Talking up liquidity: insider trading and investor relations'. *Journal of Financial Intermediation*, 14: 1–31.

ICAEW (1999). No surprises. *The case for better risk reporting*. Institute of Chartered Accountants in England and Wales (ICAEW), London.

ICAEW (2007). *Dialogue in corporate governance. Beyond the myth of Anglo-American corporate governance. Findings. Emerging Issues*. Institute of Chartered Accountants in England and Wales (ICAEW). London.

Johansson, J. (2007). 'Relationship Management by Sell-Side Analysts – The Value Creation Chain', EAA 30th Annual Congress, Lisbon, April 2007.

Koreto, R. J. (2001). 'Analyzing the Analysts', *Financial Planning Interactive*, http://www.financial-planning (accessed 15/10/2001)

Lang, M and Lundholm, R. (1993). 'Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures', *Journal of Accounting Research*, 31 (2): 246–271.

Lang, M. and Lundholm, R. J. (1996). 'Corporate disclosure policy and analyst behavior'. *The Accounting Review: a Quarterly Journal of the American Accounting Association*, 71 (4): 467–492.

Lev, B. (1992). 'Information disclosure strategy'. *California Management Review*, Summer 1992: 9–32.

Lev, B (1996). 'The boundaries of financial reporting and how to extend them'. Working paper, New York University, August 1996.

Lev, B. and Penman, S. H. (1990). 'Voluntary Forecast Disclosure, Nondisclosure and Stock Prices'. *Journal of Accounting Research*, Spring : 49–76.

Marsh, P. (1990). *Short-Termism on Trial*. Institutional Fund Managers Association. London.

Marston, C. L. (1993). *'Company communications with analysts and fund managers. A study of the investor relations activities of large UK quoted companies'*. Unpublished PhD thesis, University of Glasgow.

Marston, C. L. (1996). 'Investor Relations: Meeting the Analysts'. Research Committee of the Institute of Chartered Accountants of Scotland, Edinburgh.

Marston C. L. (1999). *'Investor Relations Meetings: Views of Companies, Institutional Investors and Analysts'*. Research Committee of the Institute of Chartered Accountants of Scotland, Edinburgh.

Marston, C. L. (2004). *A Survey of European Investor Relations*. Research Committee of the Institute of Chartered Accountants of Scotland, Edinburgh.

Myers, S. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics*, November 1977: 147–175.

National Statistics (2003). *Share Ownership. A report on ownership of shares as at 31st December 2002*. HMSO, London.

NIRI (2002). *About NIRI: NIRI Mission and Goals*. National Investor Relations Institute website, www.niri.org.

Peasnell, K., Talib, S. and Young, S. (2005). 'The Fragile Returns to Investor Relations: Evidence from a Period of Declining Market Confidence'. Financial Reporting and Business Communication Conference, Cardiff Business School.

PR Newswire (2003). *Briton's Index. Investment Research Analysts, (Spring)*. PR Newswire, United Business Media, UK.

Rao, H. and Sivakumar, K. (1999). 'Institutional Sources of Boundary-Spanning Structures: The Establishment of Investor Relations Departments in the Fortune 500 Industrials'. *Organization Science*, 10(1) 27–42.

Rees, B. (1995). *Financial Analysis 2nd edition*. Prentice Hall International (UK) Limited, Hemel Hempstead.

Roberts, J., Sanderson, P., Barker, R. and Hendry, J. (2006). 'In the mirror of the market: the disciplinary effect of company/fund manager meetings'. *Accounting Organizations and Society*, 31: 277–294.

Ruland, W. S., Tung, S. and George, N. E. (1990). 'Factors Associated with the Disclosure of managers' Forecasts'. *The Accounting Review*. July 1990: 710–721.

Skinner, D. (1995). 'Earnings, Disclosures and Shareholder Lawsuits'. Working paper, University of Michigan.

Stulz, R. M. (1999). 'Globalization of equity markets and the cost of capital'. NBER Working Paper Series. 0721. March. National Bureau of Economic Research. Cambridge, MA.

Tasker, S. C. (1998). 'Bridging the Information Gap: Quarterly Conference Calls as a Medium for Voluntary Disclosure'. *Review of Accounting Studies*, 3: 137–167.

Verrecchia, R. (1990). 'Information Quality and Discretionary Disclosure'. *Journal of Accounting and Economics*, 12: 365–380.

Walmsley, T., Yadav, P. K. and Rees, W. P. (1992). 'The information content of the company meeting programme of the Society of Investment Analysts: 1985–1990'. *Journal of Business Finance and Accounting*, 19(4): 571–584.

Yoshikawa, T. and Gedajlovic, E. R. (2002). 'The Impact of Global Capital Market Exposure and Stable Ownership on Investor Relations Practices and Performance of Japanese Firms'. *Asia Pacific Journal of Management*, 19(4): 525–540.

Tax-efficient irregular payout methods: the case of B share schemes and capital repayments via a court-approved scheme of arrangement

Dennis Oswald and Steven Young*

Abstract—Advance corporation tax (ACT) increased the tax cost to UK firms of distributing cash to shareholders. We demonstrate how the tax cost arising from ACT payments affected the channels through which UK firms returned capital to shareholders. In particular, we document and describe two unconventional irregular payout methods that enabled firms to avoid paying ACT. Firms choosing these methods are associated with significantly greater ACT problems than a control sample of firms that opted for conventional self-tender offers and special dividends. Event study tests indicate that the decision to adopt tax-efficient payout methods created significant additional value for shareholders beyond the basic cash distribution decision.

Key words: payout policy; surplus ACT; special dividends; self-tender offers; shadow ACT

1. Introduction

This paper exploits a unique historical feature of the UK tax system to investigate how corporation tax considerations influenced the channels through which firms returned capital to shareholders. Prior to 6 April 1999, UK firms paid their corporation tax in two instalments. The first instalment, known as advance corporation tax (ACT), was assessed according to the amount of income distributed to shareholders through dividends and share repurchases. The second instalment, mainstream corporation tax, was payable approximately nine months after the financial year-end, at which point firms

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could net-off ACT already paid. In principle, therefore, the burden of ACT simply represented a cash-flow-timing cost in the form of a partial pre-payment of firms' corporation tax liability. However, the situation could arise where a firm was unable to recover all or part of its ACT pre-payment. The resulting 'surplus ACT' represented an additional tax constraint that restricted corporate payouts to shareholders (Inland Revenue, 1997; Bond et al., 1996; Lasfer, 1996). Eventually the UK government bowed to pressure from the business community and scrapped ACT on 5 April 1999. The advance payment of corporation tax based on distributions to shareholders and the associated problems of surplus ACT are therefore no longer part of the prevailing UK corporate tax system.

Prior research demonstrates a link between surplus ACT and payout choice in the context of regular dividend payments. Survey evidence reported by Lasfer (1997a) suggests that concern over surplus ACT was the driving force behind scrip dividends that gave shareholders the choice of receiving dividends in cash or shares. Scrip dividend alternatives to cash were attractive to firms with surplus ACT problems because, unlike cash payouts, share replacements were not subject to ACT. On the downside, however, the absence of any cash outflow meant that scrip dividends did not fulfil the same monitoring function as cash dividends (Easterbrook, 1984). Foreign income dividends (FIDs) were introduced in July 1994

as an additional way of relieving the surplus ACT burden facing UK-based multinationals.[1] Essentially, FIDs allowed firms that paid dividends out of foreign earnings to opt out of the ACT system, thereby avoiding the costs of surplus ACT (Acker et al., 1997). Despite the potential corporate tax savings associated with scrip dividends and FIDs, neither method proved popular due to unfavourable shareholder tax treatment relative to ordinary dividend payments (Bond et al., 2005; Lasfer, 1997a). In particular, UK tax-exempt institutions such as pension funds preferred ordinary cash dividends to scrips and FIDs because prior to July 1997 cash dividends generated a repayable tax credit whereas the latter two methods did not.

Our study extends prior research on the link between ACT and payout method choice by exploring the interaction between surplus ACT and *irregular* cash disbursements. Whereas regular dividends are a suitable channel for distributing recurring cash flows, one-off payout methods such as share repurchases are the preferred means of distributing transitory excess cash (Lie, 2000; Guay and Harford, 2000; and Jagannathan et al., 2000). Surplus ACT restricted management's ability to distribute accumulations of surplus cash in the same way that it constrained regular dividend payments. Indeed, ACT may have represented an even greater barrier to irregular cash disbursements because the single-period tax cost resulting from large one-off payouts is likely to have been higher than that associated with (smaller) regular dividend payments. This situation was further compounded by the UK government's decision not to extend the FID system to share repurchases (Shirley, 1997). To date, however, no research has examined how ACT affected one-off payout methods. The aim of this paper is to document how the threat of surplus ACT led some firms to shun traditional irregular payout options in favour of tax-efficient alternatives.

Our analysis is primarily descriptive in nature. We begin by reviewing the features of two previously unexplored cash distribution methods that enabled firms to limit ACT payments. The first

method, known as a B share scheme, involved a bonus issue of stock to existing shareholders followed by immediate redemption and share consolidation. The second method, a capital repayment via a court-approved scheme of arrangement, involved creating a new holding company which then acquired the outstanding share capital of the existing group using a combination of shares and cash. A feature of both transactions is that they were treated as capital repayments rather than income distributions for tax purposes and as a consequence did not generate an ACT liability.

Despite being entirely overlooked by mainstream research, B share schemes and court-approved capital repayments accounted for some of the largest cash payouts to shareholders in recent years. In aggregate, UK firms paid out nearly £18 billion through these two methods during the seven-year window ending April 2003. This figure represents half the aggregate value of open market share repurchases over the same period (Oswald and Young, 2006); and as revealed by results reported later in this paper, it dwarfs the corresponding value of funds distributed through conventional self-tender offers (£2.2 billion) and special dividends (£14.8 billion). The first schemes appeared in 1996 but it was not until the abolition of repayable dividend tax credits to tax-exempt pension funds in July 1997 that the methods became a truly viable payout option. Prior to that date, tax-exempt institutions had little interest in payouts structured to avoid ACT because such distributions did not carry a refundable tax credit. The abolition of repayable tax credits on 2 July 1997 reduced pension funds' strict preference for ordinary dividends, thereby increasing the relative attractiveness of ACT-minimising payout methods.[2]

While minimising ACT represented a key feature of B share schemes and capital repayments via a court-approved scheme of arrangement, direct evidence on the motive(s) for their use is limited. In particular, accompanying prospectus documents tended to emphasise the practical aspects of the transaction rather than their underlying rationale. We therefore conduct a series of indirect empirical tests aimed at confirming the role of these transactions in minimising the tax cost of cash distributions to shareholders. If these schemes were motivated by surplus ACT concerns, we would expect their use to decline following the abolition of ACT in April 1999. Results support this prediction: a sharp decline in the incidence of B share schemes is observed post-April 1999, coupled with a surge in the use of conventional one-off payout methods such as special dividends and self-tender share repurchases. Cross-sectional tests also reveal that firms using these non-standard payout methods were characterised by greater ACT prob-

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[1] ACT could only be offset against firms' UK corporation tax liability. Where the tax rate on foreign profits equalled or exceeded the UK tax rate, firms' ACT offset limit was determined solely by the amount of corporation tax on profits taxable in the UK because the UK's credit system of double tax relief ensured that foreign earnings flowed into the UK net of foreign corporation tax (and therefore were not subject to any further domestic corporation tax). Under such conditions, UK-based multinationals that paid dividends but derived the majority of their profits from foreign operations faced severe surplus ACT problems because they had little or no offset capacity. FIDs were eventually abolished along with ACT in April 1999.

[2] Bond et al. (2005) document a sharp rise in both the number of firms paying FIDs and proportion of total dividends paid in the form of FIDs post-July 1997.

lems than firms favouring conventional irregular payout methods. Overall, our results support the view that some firms substituted innovatively structured payout arrangements for conventional irregular cash distribution methods in an attempt to avoid the cost of surplus ACT.

The final stage of our analysis examines whether shareholders benefited from management's decision to use a non-standard payout method. All else equal, avoiding irrecoverable ACT was clearly in shareholders' best interests. However, B share schemes and court-approved capital repayments were administratively costly compared to conventional self-tenders and special dividends. Accordingly, the net effect of these transactions on shareholder wealth is an empirical issue. Event study tests reveal that the decision to use a non-standard payout method created further value for shareholders beyond the basic cash distribution decision: conditional on payout value having previously been announced, the incremental three-day cumulative average abnormal return to news that the payout would be implemented through a B share scheme or a court-approved scheme of arrangement exceeds 3%. These results suggest that market participants recognised the corporate tax savings associated with these unconventional payout methods.

Our analysis contributes to prior research in several ways. First, we present descriptive evidence on two economically important but hitherto neglected payout methods. Second, we extend the work of Bond et al. (2005) and Lasfer (1997a, 1996) on the association between ACT and regular dividend payments by documenting how concerns over surplus ACT led firms to develop elaborate alternatives to conventional irregular payout mechanisms. Finally, our analysis adds to the emerging body of evidence concerning the determinants of payout method choice. Guay and Harford (2000) and Jagannathan et al. (2000) conclude that ordinary dividends (share repurchases) are used to distribute permanent (transitory) cash flows. Grullon and Michaely (2002) document how the Securities and Exchange Commission safe-harbor Rule 10b-18 caused US firms to begin substituting repurchases for dividends because they no longer risked regulatory investigation for stock price manipulation. Lie and Lie (1999) show how investors' personal tax status affects firms'

choice of disbursement method. Our findings extend this body of work by highlighting how corporate tax arrangements influenced the choice of irregular payout methods in the UK.

The remainder of the paper is organised as follows. The next section outlines the interaction between corporation tax and cash distributions to shareholders in the UK. Section 3 reviews the features of two unconventional irregular distribution methods that enabled firms to return cash to shareholders while avoiding the tax costs of ACT. Analyses reported in Section 4 empirically test the association between irregular payout method choice and surplus ACT. Evidence of the shareholder wealth effects associated with B share schemes and court-approved capital repayments is reported in Section 5. Section 6 concludes.

2. Institutional overview

The UK operates a partial imputation system of corporate taxation whereby income tax on distributions received by shareholders is partly deducted at source (the amount representing a tax credit). (See Lasfer (1996) for a review of the UK's imputation system of corporate taxation.) Until 5 April 1999, UK firms' corporation tax liability was paid in two instalments. The first instalment, known as advance corporation tax, was assessed quarterly based on distributions to shareholders. The ACT charge on cash dividends fluctuated with the basic rate of income tax: at the time ACT was abolished the rate stood at 25% of the net distribution. (See http://www.hmrc.gov.uk/stats/corporate_tax/rates-of-tax.pdf or http://www.ifs.org.uk/ff/corp.xls for details of how rates varied prior to this date.) A firm paying a net dividend of 80 pence per share would therefore generate an ACT liability of 20 pence per share. For share repurchases, ACT was charged at 25% of the excess of the repurchase price over the original issue price.[3] The second instalment (mainstream corporation tax) was payable nine months after the end of the accounting period, at which point firms could net-off ACT already paid. ACT therefore represented a prepayment of the corporation tax liability (hence its name) and as such merely imposed a cash-flow-timing cost on firms that made cash distributions to shareholders.

Because the ACT rate was substantially lower than the mainstream corporation tax rate, the ability to offset ACT payments against the mainstream corporate tax liability could have enabled firms to minimise corporation tax through higher payouts. To restrict this opportunity, the Treasury fixed the maximum amount of ACT that could be set-off against mainstream corporation tax at 20% of UK taxable profits (i.e. the amount of ACT due on a net dividend that together with the ACT equalled UK taxable profits). Firms would breach their maximum

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[3] Under the imputation system prevailing at that time, the ACT payment equalled the tax credit received by basic rate taxpayers when the imputation rate equalled the basic rate of income tax on dividends. Until 2 July 1997, tax-exempt shareholders such as pension funds could reclaim the tax credit on dividends, making an 80 pence net dividend worth 100 pence to such investors. The tax credit on share repurchases was not refundable, however, thereby creating a strong preference for dividends among tax-exempt investors.

ACT offset threshold if total net payouts exceeded 80% of UK taxable profits for the period. Any ACT that could not be deducted from the current year's corporation tax charge was known as surplus (or irrecoverable) ACT. Firms with surplus ACT effectively faced a classical corporate tax system as the imputation rate on payouts was reduced to zero (Acker et al., 1997). Accordingly, surplus ACT imposed an additional cost on firms and investors in the form of a higher tax rate on distributions.[4] Consistent with this increased tax cost, Lasfer (1996) documents how firms that were unable to deduct ACT from their corporation tax liability paid lower dividends, while Bond et al. (1996) find that movements into surplus ACT negatively impacted dividends. Hodgkinson (2002) shows how the presence of surplus ACT increased the cost of using dividends as a signalling mechanism.

The scale of the surplus ACT problem was considerable. Bond et al. (1996) estimated that 64% of UK non-financial firms experienced surplus ACT at least once between 1970 and 1990. Freeman and Griffith (1993) concluded that almost 30% of UK listed firms were carrying some permanent surplus ACT in 1992. By the end of 1998 the aggregate value of accumulated surplus ACT stood at £7 billion (Colville, 1999; Clayson, 1998). Among the firms most affected were UK-based multinationals with a large proportion of foreign earnings, loss-making firms, and groups whose UK taxable profits were depressed by accelerated depreciation allowances (e.g. utility businesses). Although firms could sidestep ACT by offering scrip dividends in lieu of cash payouts, shareholders were not obliged to participate in these schemes and take-up rates were typically poor (Lasfer, 1997a; Pike and Neale, 1996: 511). In addition, scrip dividends were not available to foreign investors.

Amid concerns that surplus ACT was constraining cash distributions to shareholders and reducing the attractiveness of the UK as a domicile for multinational corporations, the UK government reviewed the situation. An interim solution was introduced in July 1994 in the form of FIDs. FIDs enabled firms that paid dividends out of foreign profits to reclaim the ACT regardless of the level of UK taxable profits.[5] However, FIDs failed to solve the problem of surplus ACT for several reasons. First, the option to

declare a FID did nothing to help firms with irrecoverable ACT problems caused by accelerated depreciation allowances or low UK profits. Second, because FIDs were restricted to dividend payments, they failed to alleviate surplus ACT problems associated with alternative distribution methods such as share repurchases. Third, prior to July 1997 FIDs were less attractive to UK pension funds than ordinary dividends because unlike regular dividend payments, FIDs did not carry a refundable tax credit (Acker et al., 1997; Bond et al., 2005). A more complete solution to the surplus ACT problem eventually emerged on 25 November 1997 when the then Chancellor Gordon Brown announced that ACT on qualifying distributions would be scrapped from 5 April 1999 onwards (Inland Revenue, 1997).

While the decision to abolish ACT was welcomed by business and shareholder groups alike, it raised difficult questions for the Treasury about the treatment of accumulated surplus ACT balances. In particular, the UK government was keen to avoid accrued surpluses being netted-off against mainstream corporation tax in the immediate post-ACT period, thereby undermining tax revenues. The Treasury's response to dealing 'fairly' with accumulated surpluses was disclosed in the November 1998 Pre-Budget Report, the broad thrust of which was that surpluses carried over into the post-ACT regime must be used in a similar way and at a similar rate as in the old regime. The mechanism by which this process operated, known as 'shadow ACT', involved computation of a notional ACT charge on cash distributions made after 5 April 1999. Similar to the pre-reform period, firms were able to net ACT carry-forwards off against their corporation tax liability up to a limit of 20% of taxable profits. However, this allowance first had to be filled by the notional (shadow) ACT, with the capacity for offsetting accumulated surplus ACT balances being restricted to the residual after deducting shadow ACT for the period. (See Appendix A for further details.)

The 17-month period from the November 1997 notification of the government's plan to scrap ACT to its eventual abolition in April 1999 represented a transition period for payout policy. Some firms announced their intention to defer ordinary dividend payments to avoid generating further surplus ACT. For example, United Utilities delayed payment of its 1998 final dividend due 1 October 1998 until 6 April 1999 (combined with a 1.36 pence per share supplement to compensate for the payment delay). Meanwhile, Bond et al. (2005) report an increase in the share of dividends paid as FIDs during this period.

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[4] The fact that surplus ACT represented a long-term (possibly indefinite) cost to firms with positive payouts was recognised by UK accounting standards, which required surplus ACT to be expensed when its recovery was not reasonably certain and foreseeable (normally defined as the end of the next accounting period).

[5] In addition, a modified version of the FID scheme known as the UK International Headquarters Company (IHC) scheme was also introduced via the *Finance Act 1994* to help retain and attract international holding companies. The scheme allowed UK IHCs to pay dividends to their foreign parent company (out of foreign profits) without incurring ACT (Lewis, 1993).

3. Irregular payouts to limit ACT
Prior research has focused exclusively on ACT-minimising alternatives to regular cash dividends

such as scrip dividends and FIDs. The aim of this study is to provide complimentary descriptive evidence on the existence, structure and usage of ACT-efficient alternatives to conventional irregular payout methods such as self-tender share repurchases and special dividends. Absent prior work in this area, our analysis is exploratory and descriptive in nature.

3.1. Payout methods

Since payouts to shareholders only generated an ACT liability if they were classified as an income distribution, one obvious way of avoiding ACT was to structure an irregular payout such that it did not qualify as an income distribution. With this in mind, we searched the London Stock Exchange Regulatory News Service (RNS) for announcements of any payout-related events characterised by this feature. This search yielded two candidate transactions involving one-off payments of capital to shareholders. The first method was a B share scheme. The second method was a capital repayment via a court-approved scheme of arrangement. Further details of both transactions are provided below.

B share schemes

This transaction involved a bonus issue of special shares (classified as B shares) to existing shareholders on a pro rata basis, followed by an offer to redeem all such shares at their nominal value. The bonus issue was achieved by capitalising distributable reserves and the effect of the transaction was similar to a self-tender offer in that all shareholders participated in the repayment, with their proportionate interest in ordinary shares remaining unchanged. Crucially, because the redemption price was regarded as a capital repayment rather than a distribution of income, these schemes did not generate ACT. To illustrate the mechanics of the transaction in more detail, we describe the scheme announced by Diageo plc on 12 May 1997 (Diageo plc, 1997).

In Diageo's case, the value of the payout was set equal to 13.6% of market capitalisation immediately prior to the transaction's announcement, at which date shares were trading at 516.5 pence. This corresponded to a repayment of 70 pence per ordinary share held (or equivalently £700 per 1,000 shares), resulting in a total proposed payout of £2.8 billion. The scheme comprised two key elements. First, the £2.8 billion distribution was achieved through a capitalisation issue of redeemable B

shares to existing shareholders on the basis of 136 B shares with a nominal value of 514$^{1}\!\%_{17}$ pence each for every 1,000 existing ordinary shares held (equivalent to £700 per 1,000 shares held). These B shares were redeemable for cash at the option of shareholders during redemption periods announced by Diageo. The initial redemption period commenced on 3 February 1998, one business day after the B share issue, with Diageo reserving the right to convert all outstanding B shares to ordinary shares when fewer than 25% remained in issue. All redeemed B shares were cancelled and not subject to reissue. Unredeemed B shares ranked *pari passu* with ordinary shares in terms of voting rights and carried a preferential non-cumulative annual net dividend equal to 75% of the three-month London Interbank offered rate (LIBOR).

The second component of the scheme involved a share consolidation designed to reduce the number of outstanding ordinary shares by an amount equal to the payout. Accordingly, Diageo reduced its ordinary share capital by 13.6% by consolidating every 1,000 old ordinary shares held into 864 new ordinary shares. The old ordinary shares ceased to trade on the London Stock Exchange at close of business on Friday 30 January 1998, with both the consolidated ordinary shares and the B shares being admitted to the Exchange at 8.30 a.m. on Monday 2 February 1998.

Capital repayments via a court-approved scheme of arrangement

The second payout method that allowed firms to distribute surplus funds to shareholders without generating ACT was a capital repayment via a court-approved scheme of arrangement (under section 425 of the *Companies Act 1985*). This method differed fundamentally from a B share scheme in that the repayment was funded through a reduction in shareholders' capital (for which court approval must be sought) rather than via a transfer from distributable reserves as in the case of a B share scheme. A capital repayment via a court-approved scheme of arrangement was therefore administratively more costly than a B share scheme and as a result its attractiveness is expected to have been restricted to firms whose distributable reserves were insufficient to fund the payout (either because of accumulated losses or ongoing payout commitments).[6]

The principal feature of this payout method was the interposition of a new holding company on top of the existing group. The new holding company then issued shares plus cash (or special redeemable shares or loan notes) in exchange for shares in the existing group. In essence, therefore, the transaction amounted to a self-takeover financed by a combination of stock and cash. Accordingly, the transaction was treated as an acquisition for corporate tax purposes and hence did not attract ACT. The scheme implemented by Elementis plc is used

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[6] Note that this transaction structure was not the only available option for firms with low distributable reserves. A simpler alternative involved applying to the court for a capital reduction (to create distributable reserves), and then distributing the newly created reserves through a conventional special dividend or share repurchase. This was the option favoured by Next plc in 2002.

to illustrate the mechanics of the transaction in more detail (Elementis plc, 1998).

On 22 October 1997, Elementis plc announced its intention to return £402m of surplus capital to shareholders by way of a court-approved scheme of arrangement. The transaction involved a capital reorganisation whereby existing Elementis shareholders received three shares in a new company, Elementis (1998), and a cash payment of 280 pence for every five existing Elementis shares held.[7] Pursuant to the scheme, Elementis became a wholly owned subsidiary of Elementis (1998), with the directors of Elementis becoming directors of Elementis (1998). The scheme became effective on 23 February 1998, at which date Elementis' shares were delisted and the new Elementis (1998) ordinary shares were listed in their place. Dealing in Elementis (1998) shares commenced on 24 February, and on the same date Elementis (1998) changed its name to Elementis Holdings plc.

3.2. Direct evidence on the role of surplus ACT

A key feature of the payout methods described above was the absence of any ACT payment on the resulting cash distribution. However, while minimising surplus ACT represented a likely motive for such transactions, direct confirmation of this conjecture is difficult because accompanying prospectus documents provided little or no discussion of payout method choice. For example, the 10-page main body of the prospectus for Diageo's B share scheme contains no reference to ACT or the corporate tax benefits of the proposed scheme more generally. Instead, the discussion focuses exclusively on the underlying reason for the payout: to improve capital structure efficiency by increasing the ratio of debt to equity (Diageo, 1997: 4). A systematic examination of all prospectuses for B share schemes and capital repayments via a court-approved scheme of arrangement issued before 6 April 1999 yields the same outcome:

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[7] Alternatively, Elementis' shareholders could have elected to receive loan notes in place of all or part of the cash consideration. Loan notes bore interest payable at six-monthly intervals in arrears commencing 31 October 1998 at an annual rate of 1% below LIBOR, and were redeemable at par on any interest payment date on or after 31 October 1998 (and, in any event, were fully repayable on 30 April 2005).

[8] References to ACT were typically contained in the accompanying appendices to the main prospectus document. In a small number of cases, firms made reference to the tax- (or cost-) efficient characteristics of the transaction in the main body of the document without referring directly to ACT. One motive for the absence of direct references to the ACT benefits of these transactions may have been to reduce the likelihood of the transactions being challenged by the tax authorities.

[9] Kelda (formerly Yorkshire Water), Wessex Water, and Southern Electric all operated in the utilities sector and as such faced severe surplus ACT problems because of negligible corporation tax liabilities due to accelerated tax depreciation allowances on their capital investment programmes. Monument Oil and Gas experienced surplus ACT problems as a result of its foreign operations.

no direct reference to the ACT benefits of the transaction structure in the main body of the document.[8] Instead, disclosures typically focused on the underlying payout drivers: 62% of prospectuses highlighted management's desire to distribute surplus cash (often following disposals) and 34% stressed the need to improve balance sheet efficiency (through a reduction in the proportion of equity financing). These are the same two reasons most frequently cited by management for conventional special dividends and self-tender payouts. Accordingly, the extent to which these non-standard payout methods were motivated by a desire to avoid generating ACT on the distribution remains an open question.

4. Empirical evidence

In the absence of routine management disclosures explaining the preference for non-standard capital repayment methods over more conventional payout options, we proceed by addressing the issue empirically. Tests utilise a comprehensive sample of B schemes and capital repayments via a court-approved scheme of arrangement, together with data on conventional special dividend payments and self-tender share repurchases.

A key word search of the RNS revealed that the first B share schemes were implemented by Kelda Group plc, Wessex Water plc, and Southern Electric plc in late 1996, while the first court-approved capital repayment was undertaken by Monument Oil and Gas plc in August 1996.[9] Our sample period therefore starts in 1996 and continues through April 2003. The RNS was also used to identify conventional self-tender offers and special dividends announced during the corresponding period. Our initial search yielded a sample of 4,000 announcements made by 486 firms for the four payout methods. Removing non-UK-resident firms, uncompleted payouts, distributions conditional on completion of a merger or acquisition, and schemes of arrangement that did not involve a capital repayment reduced the sample to 651 announcements relating to 150 irregular cash disbursements made by 132 firms. The distribution of the final sample by payout method is as follows: 32 B share schemes, 11 court-approved capital repayments, 31 self-tender offers, and 76 special dividends. As expected, court-approved capital repayments occur less frequently than B share schemes due to the higher administrative costs associated with these transactions. Prospectuses and published financial statements were used to collect details of the value and structure of each distribution, together with the date on which the payout actually occurred (effective date). Payout firms are drawn from 31 Datastream level-4 industry groups, suggesting little evidence of industry clustering in our final sample. Details of our sample selection procedure are summarised in Table 1.

Table 1
Sample selection and composition

Announcements of irregular corporate payouts reported on Perfect Information for London Stock Exchange listed-firms between April 1996 and April 2003	4,000
Less: duplicates, non-UK-domiciled firms, payouts that formed part of a takeover or merger, uncompleted payouts, and schemes of arrangement unrelated to payouts	(3,349)
Announcements for final sample of payout observations	**651**

Announcements relate to:

Number of firms	132
Number of completed irregular payout events	150

Irregular payout events by type:

B share schemes	32
Court-approved capital repayment	11
Self-tender offers	31
Special dividends	76
	150

Irregular payout events by Datastream level-4 industry classification:

Automobiles & Parts	3
Banks	2
Beverages	1
Chemicals	6
Construction & Building Materials	12
Distributors	7
Electricity	5
Electronic & Electrical Equipment	1
Engineering & Machinery	7
Food & Drug Retailers	1
Food Producers & Processors	5
Gas distribution	1
Household Goods & Textiles	4
Health	3
Information Technology Hardware	4
Insurance	4
Investment Companies	1
Leisure & Hotels	9
Media & Entertainment	7
Oil & Gas	3
Packaging	4
Personal Care & Household Products	1
Real Estate	17
Retailers, General	13
Software & Computer Services	4
Speciality & Other Finance	3
Support Services	6
Telecom Services	1
Transport	8
Water	7
	150

Note: The sample of irregular cash disbursements is identified using a keyword search of the London Stock Exchange Regulatory News Service between 6 April 1996 and 5 April 5 2003.

With only 150 irregular cash disbursements occurring during our seven-year sample period, the overall incidence of irregular payouts in the UK is relatively low. Nevertheless, with an aggregate payout value in excess of £34 billion, the economic significance of these events is undeniable. Aggregate values for the individual payout methods are as follows: B share schemes (£10.1 billion), court-approved schemes of arrangement (£7.7 billion), self-tender offers (£2.2 billion), and special dividends (£14.8 billion).

4.1. Descriptive statistics

Summary statistics for the four irregular payout samples are reported in Table 2. Median payout values reported in Panel A range from 9% of lagged total assets in the case of special dividends to 22% in the case of self-tender offers. Median scaled payouts for self-tender offers and court-approved capital repayments are approximately twice as large as those made through special dividends and B share schemes. Tests reported in Panel B of Table 2 reveal that firms using B share schemes and court-approved capital repayments are substantially larger than firms using self-tender offers and special dividends in terms of both market capitalisation and total assets. Parametric tests suggest that non-standard payout firms are associated with marginally higher (lower) pre-payout leverage (scaled cash holdings). Conversely, non-parametric tests reveal no significant differences in leverage and cash performance between non-standard and conventional payout samples.

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[10] Unfortunately, disclosure rules in the UK are such that direct measures of accumulated surplus ACT are difficult to construct. SSAP 8 required firms to write off surplus ACT against income when its recoverability was 'not reasonably certain and foreseeable'. SSAP 8 disclosures may also contain additional information absent from alternative indirect proxies because they reflect managers' forecasts. However, Bond et al. (1996) suggest that SSAP 8 disclosures are unreliable because firms could elect to net-off surplus ACT against their deferred tax liability. We tested the validity of SSAP 8 data on Datastream (items 164 or 206) in several ways. First, we calculated the aggregate value of surplus ACT for all UK-listed firms estimated using item 164 (–£160.4m) and item 206 (£31.2m) as at 1998. These figures contrast with the £7 billion aggregate value reported by Colville (1999) and Clayson (1998) for 1998. Second, we used items 164 and 206 to calculate the percentage of UK-listed firms carrying some permanent surplus ACT in 1992. The fraction of firms in 1992 with a non-zero value for item 164 (206) is 17.79% (5.09%). This contrasts with the 30% of firms reported by Freeman and Griffith (1993). Third, we used items 164 and 206 to calculate the percentage of UK-listed firms that experienced surplus ACT at least once between 1970 and 1990. The fraction of firms with at least one non-zero (positive) value for item 164 between 1970 and 1990 is 44.4% (39.3%). The fraction of firms with at least one non-zero (positive) value for item 206 between 1970 and 1990 is 35.3% (16.4%). This compares with the 64% of firms reported by Bond et al. (1996). When we repeat the analyses reported in Tables 4 and 5 with surplus ACT proxies constructed using items 164 and 206 no significant differences in the tax status of non-standard and conventional payout firms are detected.

Figure 1 plots the frequency of non-standard and conventional payouts implemented between 6 April 1996 and 5 April 2003. If surplus ACT influenced payout method choice, then non-standard (conventional) payouts should be relatively more evident before (after) 6 April 1999. The evidence in Figure 1 supports this prediction. First, use of B schemes and court-approved capital repayments peaked in the period prior to ACT's abolition: of the 43 such events in our sample, 70% were implemented during the three-year period prior to 6 April 1999. Note, however, that this pattern is driven entirely by B share schemes. Second, an immediate rise in the number of self-tender offers and special dividends is clearly evident in the post-ACT regime. Both patterns are consistent with the tax cost of surplus ACT having influenced firms' choice of payout method.

An additional feature of the data presented in Figure 1 is the continued use of non-standard payouts after ACT was abolished. At first sight this result seems inconsistent with claims that these transactions were primarily designed to minimise the tax cost of surplus ACT. The shadow ACT system introduced to regulate recovery of accumulated ACT carry-forwards in the post-ACT period offers a potential explanation for this finding. Post-April 1999, management's attention switched from minimising additions to the stock of surplus ACT to utilising accumulated ACT surpluses as quickly as possible (since the value of the asset declines over time in real terms). Although shadow ACT does not add to the stock of ACT, it consumes valuable ACT set-off capacity (20% × UK taxable profits), thereby restricting firms' ability to realise the benefits of any accumulated surplus ACT asset. Accordingly, conventional irregular payout methods such as self-tender offers and special dividends are likely to have remained relatively unattractive for firms with large accumulated surplus ACT carry-forwards because such methods restricted the opportunity to realise accrued surplus ACT by consuming ACT set-off capacity. For such firms, non-standard payout methods offered a potentially effective means of avoiding shadow ACT and hence maximising the amount of accrued surplus ACT that could be utilised.

4.2. Modelling payout choice

If concern over the cost of surplus ACT influenced payout method choice, then firms using non-standard schemes should be characterised by more severe surplus ACT problems than firms opting for conventional irregular payout methods. We construct a series of surplus ACT proxies to test this prediction.[10] Our first measure uses time-series data on tax charges disclosed in firms' income statements combined with payout information to estimate the accumulated stock of surplus ACT

Table 2
Descriptive statistics for non-standard and conventional irregular payout methods

Panel A: Descriptive statistics by payout type

| | Non-standard irregular payout methods | | | | | | | | Conventional irregular payout methods | | | | | | | |
| | B share schemes | | | | Capital repayment | | | | Self-tender offers | | | | Special dividends | | | |
Variable	*N*	*Mean*	*St. dev.*	*Median*	*N*	*Mean*	*St. dev.*	*Median*	*N*	*Mean*	*St. dev.*	*Median*	*N*	*Mean*	*St. dev.*	*Median*
Scaled payout value	30	0.132	0.117	0.101	11	0.692	1.556	0.216	29	0.244	0.164	0.217	70	0.312	1.590	0.090
Market value (£ billions)	31	2.339	2.486	1.506	11	2.774	3.720	0.531	29	0.395	0.904	0.092	73	1.315	3.591	0.092
Total assets (£ billions)	30	2.939	3.303	1.898	11	2.234	3.083	0.656	29	0.550	0.906	0.132	70	2.999	14.018	0.196
Equity dividend payout	30	0.501	0.575	0.324	11	0.336	0.213	0.317	29	0.679	2.014	0.248	69	0.311	0.651	0.310
Equity dividend yield	29	0.058	0.056	0.045	11	0.032	0.021	0.034	27	0.037	0.021	0.037	69	0.054	0.067	0.039
Net leverage	29	0.329	0.186	0.346	11	0.239	0.311	0.315	28	−0.357	1.945	0.298	70	0.290	0.354	0.367
Cash holdings	30	0.170	0.273	0.082	11	0.259	0.357	0.085	29	0.829	2.007	0.159	70	0.358	0.709	0.124
Operating cash flow	30	0.168	0.106	0.138	11	0.167	0.189	0.106	28	0.191	0.191	0.148	68	0.198	0.293	0.124
Non-operating cash flow	29	0.013	0.386	−0.051	11	0.164	0.316	0.116	24	0.225	1.266	−0.019	59	0.015	0.129	0.003

Table 2
Descriptive statistics for non-standard and conventional irregular payout methods (*continued*)

Panel B: Non-standard irregular payout methods versus conventional payout methods

Variable	Non-standard irregular payout methods (B share schemes + capital repayments)				Conventional irregular payout methods (Self-tender offers + special dividends)				Probability values for differences in:	
	N	Mean	St. dev.	Median	N	Mean	St. dev.	Median	Means	Medians
Scaled payout value	41	0.282	0.823	0.108	99	0.292	1.337	0.120	0.958	0.674
Market value (£ billions)	42	2.453	2.817	1.413	102	1.053	3.097	0.092	0.013	0.001
Total assets (£ billions)	41	2.750	3.223	1.605	99	2.282	11.826	0.150	0.718	0.001
Equity dividend payout	41	0.457	0.507	0.319	98	0.420	1.224	0.297	0.802	0.116
Equity dividend yield	40	0.051	0.050	0.043	96	0.049	0.058	0.038	0.857	0.544
Net leverage	40	0.305	0.226	0.337	98	0.105	1.108	0.341	0.093	0.907
Cash holdings	41	0.194	0.296	0.084	99	0.496	1.246	0.132	0.026	0.283
Operating cash flow	41	0.167	0.131	0.132	96	0.196	0.266	0.133	0.399	0.645
Non-operating cash flow	40	0.055	0.371	-0.028	83	0.076	0.686	-0.002	0.826	0.266

Note: Variable definitions are as follows (Datastream item codes in parentheses). Scaled payout value is the total value of the payout scaled by total assets (392) at the beginning of the period. Market capitalisation is share price multiplied by the number of shares in issue. Total assets is the book value of total assets (392). Equity dividend yield and equity dividend payout are ordinary dividends paid and proposed (187) divided by market capitalisation and operating earnings (137), respectively. Net leverage is long-term liabilities (321) plus current liabilities (389) minus cash holdings (375) divided by total assets net of cash holdings (392 – 375). Cash holdings is cash (375) dividend by total assets net of cash. Operating cash flow is cash flow from operating activities (1,015) divided by total assets net of cash holdings. Non-operating cash flow is cash flow from investing activities (1,040) scaled by total assets net of cash holdings. All variables are measured at the beginning of the payout year unless otherwise stated. Sample sizes vary according to data availability. Probability values for differences in means (medians) in Panel B are for two-tailed t-tests (Wilcoxon tests).

Figure 1
Time series plots of irregular cash disbursements
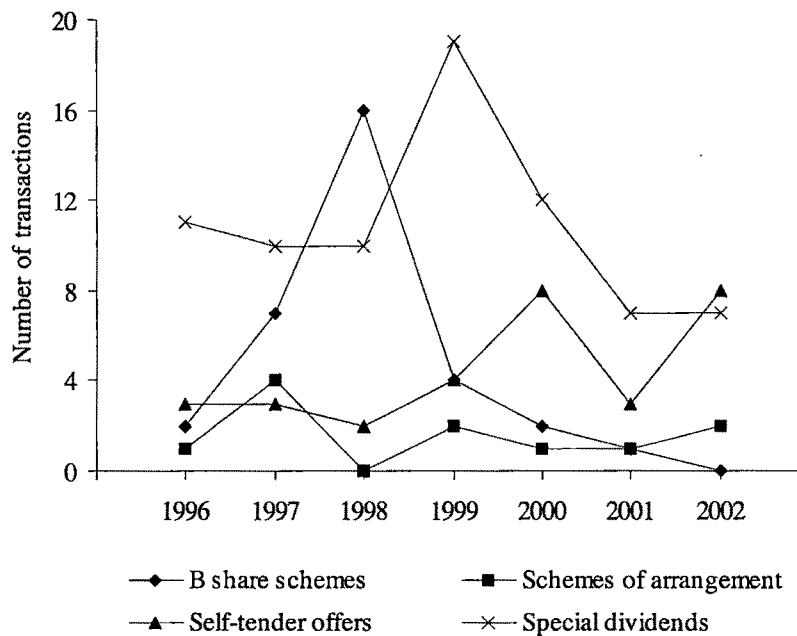
Note: The sample of irregular cash disbursements is identified using a keyword search of the London Stock Exchange Regulatory News Service between 6 April 1996 and 5 April 2003. The final sample consists of 32 B share schemes, 11 schemes of arrangement, 31 self-tender offers, and 76 special dividends. Fiscal years run from 6 April year *t* to 5 April year *t*+1. Payout transactions are allocated to fiscal years based on the effective payout date.

[11] Taxable profits are not directly observable. We estimate taxable profits using the periodic corporation tax charged (Datastream item 160) divided by the statutory tax rate. This approach will generate measurement error when firms' marginal rate of taxation differs from the statutory rate of corporation tax. Further, prior to 1987 the definition of taxable profits for the purposes of calculating the maximum ACT offset (MST) excluded chargeable gains. Chargeable gains are not publicly disclosed and therefore we are unable to adjust for their existence pre-1987. Accordingly, pre-1987 MST values are likely to represent downward biased estimates of the true offset level, resulting in upward biased estimates of accumulated surplus ACT. However, since there are no compelling reasons to expect the incidence of chargeable gains to vary systematically with payout method choice, we think it unlikely that such errors will bias our tests in favour of observing a higher accumulated surplus ACT value for firms using non-standard distribution methods.

[12] Ideally we should use geographic segmental profit data but UK GAAP only requires firms to disclose revenues and assets on a segmental basis. We use revenues rather than assets due to fewer missing observations. Re-computing equation (1) with asset data yields 104 non-missing observations compared with 144 non-missing observations when revenues are used. The Pearson (Spearman) correlation between the fraction of foreign revenues and the fraction of foreign assets is 0.803 (0.828). Repeating all tests after replacing the fraction of foreign revenues with the fraction of foreign assets yields results that are entirely consistent with those reported in the tables.

immediately prior to the payout decision. This method was developed by Higson (1993) and subsequently used by Bond et al. (1996). (A description of the method is presented in Appendix B.) This proxy attempts to faithfully recreate the procedures used to compute and account for ACT. However, the method is prone to estimation error for several reasons, including the difficulty of generating a reliable proxy for taxable profits.[11] Conditional on the decision to initiate an irregular cash disbursement to shareholders, we expect firms choosing non-standard payout methods to have had larger accumulations of surplus ACT.

Surplus ACT was a particular concern for UK-based multinationals due to restrictions on taxable profits. Our second proxy therefore uses geographic sales data (from Datastream) to estimate the level of foreign operations for firm *i* in time *t*:[12]

Fraction of foreign revenues$_{it}$ =   (1)

$$1 - \left(\frac{\textit{Revenues from UK opertations}_{it}}{\textit{Total revenues}_{it}} \right)$$

All else equal, we expect firms that used non-standard payout methods to have higher levels of

foreign operations relative to firms that opted for self-tender offers and special dividends.

Our third proxy modifies Lasfer's (1996) tax exhaustion[13] measure to identify ex post those companies likely to experience surplus ACT on actual payouts. Ex post tax exhaustion for firms using conventional special dividend and self-tender payout methods in time t is estimated as:

$$\text{Tax exhaustion}_{it}^{Con} = \qquad\qquad (2)$$
$$\text{Taxable profits}_{it} - \left(PAY_{it}^{ACT} \times [1 + \varphi]\right)$$

where *Taxable profits* is estimated as corporation tax paid (Datastream item 160) divided by the corporate tax rate, PAY^{ACT} is the net-of-tax aggregate value of all ACT-generating payouts (i.e. ordinary cash dividends plus special dividends plus share repurchases) in year t, and φ is the rate of ACT. For firms using unconventional payout methods, hypothetical ex post tax exhaustion (i.e. tax exhaustion that would have occurred had the firm distributed funds via a conventional ACT-generating payout method) is given by:

$$\text{Tax exhaustion}_{it}^{Uncon} = \qquad\qquad (3)$$
$$\text{Taxable profits}_{it} - \left(\left[PAY_{it}^{ACT} + PAY_{it}^{No\_ACT}\right] \times [1 + \varphi]\right)$$

where *Taxable profits*, PAY^{ACT} and φ are as defined in equation (2), and PAY^{NO_ACT} is the value of funds distributed through a B share scheme or a capital repayment via a court-approved scheme of arrangement. Tax exhaustion occurs when *Tax exhaustion* $_{it}^{k}$ is negative for $k = Con$ or $Uncon$. We therefore construct a tax exhaustion indicator variable equal to one where *Tax exhaustion* $_{it}^{k} < 0$ and zero otherwise. The resulting indicator variable allows us to test whether the incidence of tax exhaustion would have been greater among firms that opted for non-standard payout methods (assuming that they had instead chosen to use a self-tender offer or special divided) relative to the *actual* level of tax exhaustion experienced by firms that used conventional payout methods. This variable is prone to the same measurement error problems from estimating taxable profits as our accumulated surplus ACT proxy.

Descriptive statistics for the three surplus ACT proxies are reported in Panel A of Table 3. Mean and median values are generally larger for the non-standard payout samples compared to firms opting for conventional payout methods. Correlation coefficients reported in Panel B reveal statistically significant associations between payout method choice and all three surplus ACT proxies. Non-standard payout method usage is also positively correlated with firm size. Correlation coefficients between the three surplus ACT proxies are all positive (although not necessarily significant at the 5% level), consistent with these measures capturing aspects of the same underlying construct. Nevertheless, the correlations are small in magnitude suggesting that the variables are either (i) capturing distinct aspects of the surplus ACT phenomenon or (ii) measured with considerable error.

Formal tests of differences in surplus ACT problems across non-standard and conventional payout samples are reported in Table 4. Panel A reports results for the full sample period. (Recall that while ACT was abolished on 5 April 1999, the system of shadow ACT introduced to deal with accumulated ACT carry-forwards could still affect payout method choice after this date.) As predicted, firms opting for non-standard payout methods are characterised by significantly higher levels of foreign operations, accumulated surplus ACT, and tax exhaustion. Panel B of Table 4 reports findings after restricting the sample to observations where the effective payout date precedes 6 April 1999. Firms using non-standard payout methods are again characterised by higher levels of foreign operations and accumulated surplus ACT, although mean and median differences for the latter are no longer significant at conventional levels. Further, while 42% of conventional payout firms are tax-exhausted, the comparable fraction in the non-standard payout sample that would have been tax-exhausted had they instead employed a conventional payout method is close to 100% (difference significant at the 1% level using a chi-square test). These findings support our conjecture that the decision to use a non-standard payout method was driven by a desire to avoid ACT.

Summary statistics presented in Tables 2 and 3 suggest that non-standard and conventional payout firms differ in ways other than their surplus ACT status. To control for the effects of these additional factors, we estimate the following logistic regression relating payout method choice to proxies for surplus ACT and a vector of control variables:

$$\log\left[\frac{p_i}{1-p_i}\right] = \delta + \gamma SACT_i + \sum_{k=1}^{K} \lambda_k Control_{ki} \qquad (4)$$

where p_i is the probability of using a non-standard payout method ($y_i = 1$) and $1 - p_i$ is the probability of using a conventional payout method ($y_i = 0$), *SACT* is a measure of surplus ACT, and *Control* is a vector of k control variables. Absent prior theory and empirical evidence regarding the determinants of non-standard payout methods, the procedure for choosing the control variables is unavoidably exploratory. Firm size (total assets) is included because results in Table 2 indicate that non-standard

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[13] The term tax exhaustion was originally used to describe firms with a zero or negative corporation tax liability and unrelieved ACT. More generally, Lasfer (1996) considers firms to be tax-exhausted when taxable profits are lower than gross dividends.

Table 3
Summary statistics surplus ACT proxies

Panel A: Descriptive statistics by payout type

| | Non-standard irregular payout methods | | | | | | | | Conventional irregular payout methods | | | | | | | |
| | B share schemes | | | | Capital repayment | | | | Self-tender offers | | | | Special dividends | | | |
Variable	N	Mean	St. dev.	Median	N	Mean	St. dev.	Median	N	Mean	St. dev.	Median	N	Mean	St. dev.	Median
Fraction of foreign revenues	30	0.318	0.310	0.251	10	0.237	0.265	0.235	30	0.175	0.284	0.000	74	0.115	0.218	0.000
Accumulated surplus ACT	30	0.017	0.017	0.011	11	0.006	0.013	0.000	29	0.007	0.008	0.003	70	0.007	0.014	0.001
Tax-exhausted indicator = 1	32	0.938	0.246	1.000	10	0.900	0.316	1.000	28	0.429	0.504	0.000	73	0.534	0.502	1.000

Table 3
Summary statistics surplus ACT proxies *(continued)*

Panel B: Correlation coefficients

	Non-standard payout = 1		Fraction of foreign revenues		Accumulated surplus ACT		Tax-exhausted indicator = 1	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
Fraction of foreign revenues	0.280*	0.326*						
Accumulated surplus ACT	0.219*	0.173*	0.033	0.190*				
Tax-exhausted indicator = 1	0.399*	0.399*	0.286*	0.307*	0.181*	0.216*		
Post-April 1999 indicator = 1	-0.302*	-0.302*	0.027	-0.034	-0.166*	-0.195*	-0.035	-0.035
Surplus ACT principal component	0.401*	0.425*	0.132	0.314*	0.769*	0.685*	0.770*	0.804*
Scaled payout value	-0.004	0.036	-0.047	0.103	-0.068	-0.055	-0.073	0.102
Market value (£ billions)	0.206*	0.480*	0.199*	0.368*	0.012	0.175*	0.017	0.290*
Total assets (£ billions)	0.021	0.446*	0.176*	0.373*	-0.018	0.161	0.079	0.349*
Equity dividend yield	0.016	0.134	0.001	0.161	-0.004	0.115	0.134	0.124
Equity dividend payout	0.016	0.052	0.064	0.111	0.166	0.159	-0.082	0.075
Net leverage	0.096	-0.010	0.096	0.055	0.066	0.039	0.157	0.059
Cash holdings	-0.129	-0.091	-0.109	0.031	-0.062	-0.009	-0.199*	-0.142
Operating cash flow	-0.057	0.040	-0.064	0.006	0.029	-0.002	-0.239*	-0.175*
Non-operating cash flow	-0.016	-0.101	-0.058	-0.123	-0.015	-0.031	-0.088*	-0.073

Note: Irregular payout methods are classified into (B share schemes and court-approved capital repayments) and conventional (self-tender offers and special dividends) categories. The fraction of foreign revenues is one non-standard minus the proportion of total revenues (104) derived from UK operations. Tax-exhausted indicator is equal to one if taxable profits in the payout year < gross payout in the payout year and zero otherwise. Taxable profit is measured as UK corporation tax payable divided by the corporate tax rate. For the self-tender offer and special dividend samples, gross payout is the value of payouts subject to ACT (i.e. net dividends paid (434) × 1.25 plus share repurchases). For the B share and scheme of arrangement samples, gross payout is the hypothetical value of payouts subject to ACT assuming that the amounts distributed through non-standard payout methods had been subject to ACT (i.e. net dividends paid (434) × 1.25 plus the value of the B share or scheme of arrangement payout). Accumulated surplus ACT is computed using the Higson (1993) model as described in Devereux (1986) and summarised in Appendix B. The post-April 1999 indicator variable in Panel B takes a value of one when the effective payout date is on or before 5 April 1999 and zero otherwise. The surplus ACT principal component is the first principal component for the post-April 1999 indicator, the tax exhaustion indicator, the fraction of foreign revenues variable, the accumulated surplus ACT variable formed using the full sample: The superscript * in panel B indicates correlations that are significant at the 5% level.

Table 4
Univariate tests

	Non-standard			Conventional			p-value for difference in:	
	N	Mean	Median	N	Mean	Median	Means	Medians
Panel A: Full sample								
Fraction of foreign revenues	40	0.298	0.251	104	0.132	0.000	0.001	0.001
Accumulated surplus ACT	41	0.014	0.006	99	0.007	0.002	0.021	0.042
Tax-exhausted indicator = 1	42	0.929	–	101	0.505	–	0.002	–
Panel B: Pre-April 1999								
Fraction of foreign revenues	29	0.290	0.210	37	0.077	0.000	0.001	0.001
Accumulated surplus ACT	28	0.015	0.008	34	0.009	0.002	0.219	0.118
Tax-exhausted indicator = 1	30	0.933	–	38	0.421	–	0.001	–

Note: Irregular payout methods are classified into non-standard (B share schemes and court-approved capital repayments) and conventional (self-tender offers and special dividends) categories. Results reported in Panel A are computed using all payout observations with effective dates between 6 April 1996 and 5 April 2002. Results reported in Panel B are computed using payout observations with effective dates between 6 April 1996 and 5 April 1999. The fraction of foreign revenues is one minus the proportion of total revenues (104) derived from UK operations. Tax-exhausted indicator is equal to one if taxable profits in the payout year < gross payout in the payout year and zero otherwise. Taxable profit is measured as UK corporation tax payable divided by the corporate tax rate. For the self-tender offer and special dividend samples, gross payout is the value of payouts subject to ACT (i.e. net dividends paid (434) × 1.25 plus share repurchases). For the B share and scheme of arrangement samples, gross payout is the hypothetical value of payouts subject to ACT assuming that the amounts distributed through non-standard payout methods had been subject to ACT (i.e. net dividends paid (434) × 1.25 plus the value of the B share or scheme of arrangement payout). Accumulated surplus ACT is computed using the Higson (1993) model as described in Devereux (1986) and summarised in Appendix B. Probability values for differences in means (medians) relate to two-tailed t-tests (Wilcoxon tests) in all cases except for the tax-exhausted indicator, where probability values relate to a chi-square test. Sample sizes vary according to data availability.

payout firms are typically larger than their conventional payout counterparts. Three measures of cash performance (cash holdings, operating cash flow and non-operating cash flow, each scaled by total assets net of cash) are included because non-standard payout firms frequently cite surplus cash as a key factor motivating the payout decision. Similarly, we include leverage in the vector of controls because firms opting for non-standard payout methods often cite improving balance sheet efficiency as a key transaction objective. Dividend yield and payout value (scaled by lagged total assets) are included to capture any residual differences in underlying payout strategy across the two samples (despite the absence of any significant univariate differences in Table 2). All control variables with the exception of payout value are measured at the beginning of the payout year. Finally,

we include a post-July 1997 indicator variable to control for the increased attractiveness of non-standard payout methods following the abolition of refundable tax credits to tax-exempt shareholders on 2 July 1997.

Table 5 presents coefficients and model summary statistics for Equation (4) estimated using a variety of surplus ACT proxies. The post-April 1999 indicator variable in Model 1 is negative and significant (at the 1% level), confirming graphical evidence in Figure 1 that the incidence of non-standard payout methods declined following ACT's abolition. The incidence of non-standard payout methods is positively and significantly associated with tax exhaustion in Model 2 (at the 1% level): compared with the actual level of tax exhaustion experienced by firms in the conventional payout sample, the incidence of tax exhaustion among firms using non-standard payout methods would have been greater had they opted to use a self-tender offer or special divided. In contrast, although the estimated coefficient on the foreign operations variable in Model 3 is positive as predicted, it is not significant at conventional levels.[14] As expected, Model 4 reveals the probability of

[14] Further analysis reveals that the lack of significance is driven by collinearity with firm size. Results reported in Panel B of Table 4 indicate significant correlations between the fraction of foreign operations and firm size (both market capitalisation and total assets). When Model 4 is re-estimated after omitting total assets, the coefficient on foreign operations becomes significant at the 5% level.

Table 5
Summary statistics and coefficient estimates for logistic regressions (two-tailed probability values in parentheses)

|	Full sample (Models 1–5)					Pre-6 April 1999 sample (Models 6–9)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-10.665 (0.001)	-10.965 (0.001)	-8.879 (0.001)	-10.071 (0.001)	-6.841 (0.008)	-14.602 (0.002)	-10.511 (0.010)	-12.749 (0.003)	-9.674 (0.019)
Post-April 1999 indicator = 1	-2.230 (0.001)								
Tax-exhausted indicator = 1		2.736 (0.001)				3.638 (0.005)			
Fraction of foreign revenues			0.798 (0.346)				2.894 (0.125)		
Accumulated surplus ACT				71.945 (0.006)				83.216 (0.059)	
Surplus ACT principal component					1.681 (0.001)				2.179 (0.005)
Payout value	0.238 (0.217)	0.213 (0.539)	-0.058 (0.942)	0.256 (0.217)	-1.353 (0.593)	0.169 (0.842)	0.088 (0.844)	0.241 (0.562)	0.223 (0.741)
Cash holdings	0.618 (0.807)	-1.124 (0.641)	-2.365 (0.279)	-2.653 (0.315)	-1.747 (0.538)	0.494 (0.916)	-0.519 (0.915)	-0.201 (0.965)	-0.969 (0.862)
Operating cash flow	6.192 (0.060)	9.959 (0.005)	7.963 (0.013)	8.403 (0.011)	9.426 (0.016)	3.351 (0.563)	4.122 (0.400)	7.050 (0.176)	5.546 (0.333)
Investing cash flow	3.019 (0.094)	2.649 (0.149)	2.290 (0.193)	1.899 (0.313)	2.627 (0.189)	-3.341 (0.472)	-2.966 (0.439)	-2.258 (0.567)	-3.127 (0.486)
Net leverage	1.528 (0.271)	0.890 (0.519)	-0.033 (0.958)	0.497 (0.703)	0.796 (0.595)	-0.610 (0.790)	0.283 (0.900)	2.557 (0.360)	0.369 (0.897)
Natural logarithm of total assets	0.576 (0.001)	0.448 (0.004)	0.484 (0.001)	0.508 (0.001)	0.280 (0.062)	0.805 (0.009)	0.624 (0.014)	0.669 (0.005)	0.589 (0.030)
Dividend yield	0.941 (0.866)	1.861 (0.757)	4.508 (0.396)	0.808 (0.888)	0.150 (0.981)	-1.134 (0.875)	5.501 (0.442)	1.121 (0.888)	1.414 (0.847)

Table 5
Summary statistics and coefficient estimates for logistic regressions (two-tailed probability values in parentheses) *(continued)*

	Full sample (Models 1–5)					Pre-6 April 1999 sample (Models 6–9)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Post-July 1997 indicator = 1	2.459	0.880	0.897	1.331	1.242	1.951	1.702	2.373	2.015
	(0.002)	(0.254)	(0.199)	(0.084)	(0.132)	(0.080)	(0.075)	(0.033)	(0.089)
Likelihood ratio	49.865	51.351	34.515	45.565	58.599	40.712	31.095	33.433	42.797
p-value for χ^2 statistic	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Max-rescaled R-square	0.470	0.493	0.355	0.437	0.561	0.706	0.584	0.616	0.730
Percentage correctly classified	73.6	70.9	68.6	69.4	70.1	70.4	68.5	68.5	74.1
N	121	117	118	121	114	54	54	54	54
Implied probability of using a non-standard payout method									
Post-April 1999									
Indicator = 0	0.585								
Indicator = 1	0.132								
Tax-exhausted									
Indicator = 0		0.045				0.135			
Indicator = 1		0.423				0.855			
Fraction of foreign revenues									
Quartile 1			0.247				0.524		
Quartile 3			0.306				0.733		
Accumulated surplus ACT									
Quartile 1				0.176				0.488	
Quartile 3				0.321				0.722	
Surplus ACT principal component									
Quartile 1					0.050				0.222
Quartile 3					0.453				0.897

Note: The logistic model relates the probability of choosing to distribute cash via either a B share scheme or a court-approved capital repayment in preference to using a self-tender offer or special dividend, to a series of variables proxying for surplus ACT and a vector of control variables. The post-April 1999 indicator variable takes a value of one when the effective payout date is on or before 5 April 1999 and zero otherwise. The surplus ACT principal component is the first principal component formed from the appropriate set of surplus ACT proxies. For the full sample (Model 5), the set of surplus ACT proxies used to form the principal component are the post-April 1999 indicator, the tax exhaustion indicator, the fraction of foreign revenues, and the accumulated surplus ACT variable. For the pre-April 1999 sample (Models 9), the set of surplus ACT proxies used to form the principal component are the tax-exhausted indicator, the fraction of foreign revenues, and the accumulated surplus ACT variable. The post-July 1997 indicator takes the value of one if the payout date falls after 2 July 1997 and zero otherwise. All remaining variable definitions are reported in Tables 2 and 3. The likelihood ratio is the difference between minus two × log-likelihood from the fitted model and the equivalent value for the intercept-only model. A cut-off probability of 0.5 is used to determine the percentage of observations correctly classified by the model. The max-rescaled R-square is based on the method described by Nagelkerke (1991). The implied probabilities for variable k are computed with all remaining binary (continuous) variables in the model set equal to one (their sample means).

Figure 2
CAARs surrounding announcements of B share schemes and court-approved capital repayments
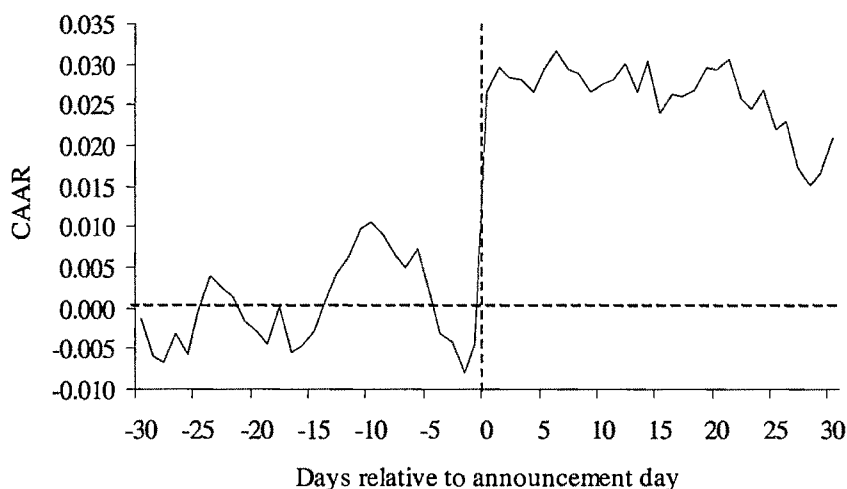
Note: CAARs are based on a sample of 43 observations, comprising 32 B share schemes and 11 schemes of arrangement. CAARs are computed using the market model, with betas estimated using the Scholes-Williams procedure.

using a non-standard payout method is increasing in the stock of accumulated surplus ACT. Finally, Model 5 relates payout method choice to the principal component formed out of the individual ACT proxies used in Models 1–4. The estimated coefficient on the ACT principal component in Model 5 is positive and significant at the 1% level.

Examination of the control variables in Models 1–5 indicates that the incidence of non-standard payout schemes increased following the abolition of refundable tax credits to tax-exempt shareholders in July 1997. At the firm level, non-standard schemes tend to be favoured by larger firms. Firms opting for non-standard and conventional payout methods are otherwise similar in terms of payout value, cash profile, capital structure, and ordinary dividend policy. In addition, untabulated supplementary tests indicate that results for the surplus ACT proxies are insensitive to the choice or definition of control variables.

Models 6–9 repeat the analysis after restricting the sample to payouts predating the abolition of ACT in April 1999. The use of non-standard payout methods is positively and significantly associated with tax exhaustion in Model 6 (at the 1% level) and accumulated surplus ACT in Model 8 (at the 6% level). Consistent with Model 3, the estimated coefficient on foreign operations is positive but insignificant due to collinearity with firm size. Finally, the estimated coefficient on the ACT principal component formed out of the three individual ACT proxies used in Models 6–8 is positive and significant at the 1%

level in Model 9. Overall, results reported in Table 5 strongly support the view that B share schemes and capital repayments via a court-approved scheme of arrangement were used to minimise the tax cost of distributing cash to shareholders.

5. Shareholder wealth effects

All else equal, limiting ACT through tax-efficient payout methods is consistent with management acting in shareholders' best interests. However, the net effect of these transactions on shareholder wealth is difficult to gauge given that they cost considerably more to implement and administer than conventional irregular payout methods. The final stage of our analysis therefore explores the impact on shareholder wealth of using a non-standard payout method to return funds to shareholders.

Tests focus on the market reaction to the decision to distribute funds via a B share scheme or a court-approved scheme of arrangement. Abnormal returns around the day that news of the payout method was first released to the market are computed using the market model estimated over 150 trading days ending 45 days prior to the announcement day. Market model betas are estimated using the procedure proposed by Scholes and Williams (1977). Cumulative average abnormal returns (CAARs) for the 60-day window centred on the payout announcement day are presented in Figure 2. A positive jump in CAARs is clearly evident around the announcement day. As reported in Panel A of Table 6, the three-day (−1, +1) announcement-period CAAR is 3.8% and

Table 6
Announcement-period abnormal returns

	CAARs relative to announcement day		
	(−30 to −2)	(−1 to +1)	(+2 to +30)
Panel A: Payout method announcements			
First announcement containing news of payout method (N = 43)	−0.77% 20:23 (0.74)	3.77% 32:11 (0.01)	−0.84% 20:23 (0.81)
Panel B: Announcements partitioned by news of payout value			
Payout method and value announced concurrently (N = 25)	0.52% 11:14 (0.85)	4.16% 20:5 (0.01)	−2.74% 9:16 (0.09)
Payout method announced after transaction value (N = 18)			
Transaction value announcement	−1.60% 10:8 (0.90)	4.07% 11:7 (0.01)	0.68% 11:7 (0.62)
Payout method announcement	−1.14% 9:9 (0.66)	3.23% 12:6 (0.01)	1.81% 11:7 (0.18)

Note: The sample consists of 43 observations, comprising 32 B share schemes and 11 schemes of arrangement. Cumulative average abnormal returns (CAARs) are computed using the market model, with betas estimated using the Scholes-Williams procedure. The sample is partitioned according to whether payout method and value were announced concurrently or separately. For the 18 observations where payout method and value announcements occur on separate days, the announcement of the total value of the proposed distribution always precedes the announcement of the distribution method. The number of positive and negative (positive: negative) cumulative abnormal returns is reported below each CAAR value, followed by the probability value for a two-tailed test of the null hypothesis that the CAAR is equal to zero.

statistically significant at the 1% level. There is no evidence that the market systematically anticipates these payout announcements. Similarly, the post-event window (+2, +30) CAAR is also indistinguishable from zero, suggesting that the announcement-period reaction is complete.

While the preceding analysis provides evidence of the shareholder wealth effects associated with the decision to distribute surplus funds, it does not enable us to unambiguously disentangle the effects of payout method from payout value because announcements of payout method always contain information on the value of the proposed distribution. If B share schemes and court-approved capital repayments represent a cost effective way of minimising the tax impact of the distribution, news of the payout method should generate incrementally positive returns beyond those associated with the value of the proposed distribution. We there-

fore test whether the market reacts positively to news of the payout method, conditional on details of the distribution value already being known.

We address this question using a subsample of 18 observations where news of the distribution method is preceded by a preliminary statement outlining management's intent to return capital to shareholders at some (typically unspecified) future date. Crucially, while these 18 preliminary statements indicate the value of the proposed payout, they are silent on the specific payout method that will be adopted.[15] Accordingly, abnormal returns surrounding these preliminary statements capture the market's response to news of an irregular cash disbursement, while those surrounding the second, more detailed payout announcement capture the incremental reaction to news of the distribution method. For the remaining 25 observations in our sample, the first statement relating to the proposed distribution contains both value and payout method details, thereby confounding our ability to isolate the payout method-specific effect.

Panel B of Table 6 reports CAARs for the sample partitioned according to the relative timing of

[15] The mean (median) number of days between the preliminary distribution intention statement and the full payout announcement is 93 (59) days. Preliminary payout statements typically form part of either results (interim or final) or disposal announcements.

the payout value and method announcements. For the 25 observations where details of the payout value and method are announced concurrently, the three-day announcement-period CAAR is 4.2%, which is significant at the 1% level. Results for the sample of announcements where news of the distribution value precedes that of the payout method indicate that the market reacts positively to news of the proposed payout independent of distribution method (4.1%; probability value equal to 1%). More importantly, market participants also react favourably to news of the payout method (3.2%; probability value equal to 1%). These sequential announcement results suggest that the choice of payout method created further value for shareholders beyond the basic distribution decision, presumably because it helped reduce surplus ACT costs.[16] The magnitude of the average announcement-period return is also consistent with a crude estimate of the value of the associated tax savings.[17]

An additional noteworthy feature of the results in Panel B is the apparent disparity between aggregate announcement-period abnormal returns for concurrent announcers (4.2%) and sequential announcers (4.1 + 3.2 = 7.3%). Univariate comparisons between the two samples yield few statistically significant firm-specific differences that could help explain this disparity. In particular, the two samples are statistically indistinguishable in terms of scaled payout value, firm size, and estimated surplus ACT problems. Other possible explanations for the observed discrepancy that we did not explore include sequential announcers' disclosures containing additional firm-specific information (see Footnote 14) and selection bias.

6. Conclusions

This paper demonstrates how corporate tax considerations shape firms' payout policies. Prior research concerning the determinants of payout method choice is limited, with studies only recently docu-

menting a link between distribution channel choice and factors such as cash flow sustainability (Lie, 2000; Guay and Harford, 2000; and Jagannathan et al., 2002), regulatory constraints (Grullon and Michaely, 2002), and investors' personal considerations (Lie and Lie, 1999). To the best of our knowledge, only Lasfer (1997a, 1997b) explores the link between corporation tax arrangements and payout method choice in the context of scrip dividends. The impact of corporation tax arrangements on irregular payout methods has not been previously examined.

We present evidence on the interaction between corporation tax arrangements and payout method choice using UK data. The UK offers a unique experimental setting in which to empirically explore this link. Prior to 6 April 1999, UK firms were required to pay corporation taxes in two instalments. The first instalment, known as ACT, was assessed according to the amount distributed to shareholders through dividends or share repurchases. The second instalment, mainstream corporation tax, was payable approximately nine months after the end of the accounting period, at which point firms could net-off the ACT already paid. For firms unable to recover all or part of the ACT prepayment against the mainstream corporation tax payment, the resulting surplus ACT represented a significant additional cost associated with cash disbursements to shareholders. In this context, we test whether the tax cost arising from ACT payments affected the channels through which UK firms returned capital to shareholders.

Consistent with the view that corporation tax considerations influence payout choices, we document use of two non-standard payout methods that enabled firms to avoid ACT. One method, known as a B share scheme, involves a bonus issue of special shares to existing shareholders on a pro rata basis, followed by an offer to redeem all such shares at their nominal value. The second method, a court-approved capital repayment, amounts to a self-takeover financed by a combination of stock and cash. Since neither method is treated as an income distribution for tax purposes, these schemes did not trigger an ACT payment. The conclusion that management sought to implement tax-efficient irregular payout methods compliments evidence that ACT was the primary factor motivating management to offer shareholders a scrip dividend alternative to regular cash dividends Lasfer (1997a).

Using a seven-year sample window spanning ACT's reform, we find that the majority of B share schemes and court-approved capital repayments were implemented prior to ACT being scrapped. Conversely, we document an immediate surge in conventional one-time payout methods (self-tender offers and special dividends) following ACT's removal. Comparing firms that employed B share schemes and court-approved capital repayments with a control sample of conventional self-tender

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[16] An alternative explanation for the positive returns to the second announcement containing details of the payout method is reduced uncertainty regarding the probability of the payout occurring. If this were the case, we would expect the CAAR for the first value-only announcement to be lower than that observed for the 25 cases where management simultaneously announced details of payout method and value (because value-only announcements are characterised by greater uncertainty). Results reported in Table 6 do not support this prediction: the CAAR for the value-only announcements is 4.07% compared with 4.16% for the sample of concurrent announcements (difference not significant at conventional levels).

[17] Based on the mean market capitalisation at the balance sheet date preceding the effective payout date, a 3.23% announcement-period CAAR (Table 6, Panel B) equates to an average increase in firm value of approximately £78m. Using the sample mean payout value of £413m, the average amount of surplus ACT saved as a result of using either a B share scheme or a court-approved scheme of arrangement is estimated at £83m (i.e. [£413m x 0.8] × 0.25, assuming a zero present value for the ACT that would otherwise have been due).

offers and special dividend payments indicates significantly greater surplus ACT problems among firms in the former group. Analysis of the market reaction to non-standard payout announcements reveals that the choice of payout method created additional value for shareholders beyond the basic cash distribution decision. Overall, our findings provide strong support for the view that UK firms substituted innovative and sophisticated distribution techniques for conventional one-time payout methods so as to minimise the tax cost of distributing cash to shareholders.

Appendix A
Shadow ACT

The rules governing shadow ACT largely replicate those that were in operation prior to 6 April 1999 and are applicable to firms with surplus ACT carried forward from the previous regime. If such a firm pays a dividend (or repurchases shares) in the post-ACT period it will be deemed liable to pay shadow ACT at the rate of 25% of the distribution, which is then notionally set off against the firm's mainstream corporation tax liability. In contrast to the situation prior to ACT's abolition, however, it does not reduce the firm's actual corporation tax liability. Instead, it utilises the set-off capacity, which remains approximately equal to 20% of taxable profits (as was the case in ACT regime). Surplus ACT brought forward can then be set off against any ACT capacity remaining after having deducted shadow ACT. This set-off results in an actual reduction in the firm's corporation tax liability. The following numerical example illustrates how the system operates in practice.

A firm with carried forward surplus ACT of £1m pays a dividend of £400,000 in the year ended 5 April 2000 in which it has taxable profits of £1.2m. The maximum capacity for setting off ACT in that year is £240,000 (£1.2m × 20%), and shadow ACT for the period is equal to £100,000 (£400,000 × 25%, where 25% is the rate at which ACT is paid). The amount of past surplus ACT that can be set off is therefore restricted to £140,000 (£240,000 − £100,000) and the overall corporate tax liability is reduced by the corresponding amount. At the end of the period, the remaining balance on accumulated surplus ACT is reduced to £860,000.

Appendix B
Computing accumulated surplus ACT

This appendix outlines the method of estimating accumulated surplus ACT ($SACT$) proposed by Higson (1993), described by Devereux (1986), and used by Bond et al. (1996). (Datastream financial statement item codes in parentheses.)

ACT due in time t is given by

$$ACT_t = \frac{\tau p \times PAY_t}{1 - \tau p},$$ (A.1)

where PAY_t is aggregate payout (dividends plus repurchases) in period t net of the starting rate tax credit and τp is the basic rate of income tax. The maximum ACT offset (MST) allowable in year t is given by

$$MST_t = \min\{\tau p \times \pi T_t, (\tau_c \times \pi T_t) - DTR_t\},$$ (A.2)

where τT_t is taxable profit (#160 divided by the corporate tax rate), τ_c is the full rate of corporation tax, and DTR is double tax relief (#162). In any given year, the total amount of ACT to be offset is ACT_t plus unrelieved (i.e. surplus) ACT brought forward from the previous period ($SACT_{t-1}$). The amount of ACT that can actually be relieved in year t ($RACT_t$) is therefore equal to

$$RACT_t = \min\left\{\frac{\tau p \times PAY_t}{1 - \tau p} + SACT_{t-1}, MST_t\right\},$$ (A.3)

and the amount of surplus ACT carried forward is given by

$$SACT_t = \max\left\{\frac{\tau p \times PAY_t}{1 - \tau p} + SACT_{t-1} - RACT_{t-1}, 0\right\}.$$ (A.4)

We apply equations A1 – A4 to each firm in our irregular payout sample using a time-series beginning in 1984 (or the first year of data availability where later). We restrict data to the post-1983 period due to the tax reforms introduced in early 1984 which changed the order in which double tax relief and ACT could be netted off against corporation tax. We set the value of $SACT_{t-1}$ equal to surplus ACT written off against profit (#164) in the first year of each firm's time-series.

References

Acker, D., Ashton, D. and Green. S. (1997). 'Tax, corporate behaviour, and the foreign income dividend scheme'. *Journal of Business Finance and Accounting*, 24(1): 125–143.

Bond, S. Chennells, L. and Devereux, M. (1996). 'Taxes and company dividends: A microeconomic investigation exploiting cross-sectional variation in taxes'. *Economic Journal*, 106: 320–333.

Bond, S., Devereux, M. and Klemm, A. (2005). 'Dissecting dividend decisions'. Working paper, University of Warwick.

Clayson, M. (1998). 'ACT lives on – in the shadows'. *International Tax Review* (February): 1–5.

Colville, J. (1999). 'The lurker in the shadows'. *Accountancy*, 123 (July): 98–99.

Devereux, M. (1986). 'The IFS model of UK corporation tax'. IFS Working Paper No. 84, Institute for Fiscal Studies.

Diageo plc (1997). 'Proposed capital repayment to shareholders, share capital consolidation, and amendments to memorandum and articles of association'. Circular to Shareholders, 22 December 1997.

Easterbrook, F. (1984), 'Two agency-cost explanations of dividends'. *American Economic Review*, 74: 650–659.

Elementis plc (1998). 'Proposed Scheme of Arrangement (under section 425 of the Companies Act 1985) resulting in a new holding company Elementis (1998) and proposed capital repayment to shareholders'. Circular to Shareholders, 5 January 1998.

Freeman, H. and Griffith, R. (1993). 'Surplus ACT – A solution in sight?'. *Fiscal Studies*, 14(4): 58–73.

Grullon, G. and Michaely, R. (2002). 'Dividends, share repurchases, and the substitution hypothesis'. *Journal of Finance*, 57(4): 1649–1684.

Guay, W. and Harford, J. (2000). 'The cash flow permanence and information content of dividend increases vs. repurchases'. *Journal of Financial Economics*, 57: 385–415.

Higson, C. (1993). 'Corporate Financial Behaviour in the Presence of Taxes', PhD thesis, London Business School.

Hodgkinson, L. (2002). 'Tax costs and signalling benefits: The impact of surplus ACT'. *Journal of Business Finance and Accounting*, 29(3&5): 411–428.

Inland Revenue (1997). *A Modern System of Corporation Tax Payments*, H.M. Treasury, London.

Jagannathan, M., Stephens, C. and Weisbach, M. (2000). 'Financial flexibility and the choice between dividends and stock repurchases'. *Journal of Financial Economics*, 57: 355–384.

Lasfer, M. (1996). 'Taxes and dividends: The UK evidence'. *Journal of Banking and Finance*, 20: 455–472.

––––– (1997a). 'Scrip dividends: the management's view'. *European Financial Management*, 3(2): 237–249.

––––– (1997b). 'On the motivation for paying scrip dividends', *Financial Management*, 26(1): 62–80.

Lewis, P. (1993). 'Surplus ACT'. *Fiscal Studies*, 14: 74–81.

Lie, E. (2000). 'Excess funds and agency problems: An empirical study of incremental cash disbursements'. *Review of Financial Studies*, 13: 219–248.

Lie, E. and Lie, H. (1999). 'The role of personal taxes in corporate decisions: An empirical analysis of share repurchases and dividends'. *Journal of Financial and Quantitative Analysis*, 34(4): 533–552.

Nagelkerke, N. (1991). 'A note on a general definition of the coefficient of determination'. *Biometrika*, 78: 691–692.

Oswald, D. and Young, S. (2006). 'Corporate taxation, surplus cash and agency problems: The impact on cash disbursements by UK firms of the decision to abolish advance corporation tax'. Working paper, Lancaster University.

Pike, R. and Neale, B. (1996). *Corporate Finance and Investment* (2nd edition) Prentice Hall Europe: Hemel Hempstead.

Scholes, M. and Williams, J. (1977). 'Estimating betas from non-synchronous data'. *Journal of Financial Economics*, 5: 309–327.

Shirley, P. (1997). 'Share repurchases'. *Fiscal Studies*, 18(2): 211–221.

Bankruptcy costs, leverage and multiple secured creditors: the case of management buy-outs

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Abstract—Using a unique, hand-collected final dataset of 57 management buy-outs in distress, this paper analyses the determinants of bankruptcy costs under the UK's receivership regime. We show that the direct costs of receivership consume a significant percentage of the receivership proceeds, with mean receivership costs equal to 30% of receivership proceeds. Importantly we find that while the average length of receivership was 3.0 years, 95% of repayments are made on average within 1.9 years. Our findings do not support the argument that multiple lenders create inefficiencies resulting in significantly lower secured creditor recovery rates. However, when there are multiple secured lenders, the senior secured lender gains at the expense of other secured creditors. We find that receivership costs are positively related to the proportion of secured debt repaid and that, consistent with the presence of a scale effect, the relative significance of receivership costs declines as firm size grows. Receiverships last longer the larger the amount of debt owed to the secured lenders.

Key words: bankruptcy; secured debt; financial distress costs; management buy-outs; private equity

1. Introduction

The efficiency of the bankruptcy process has been the subject of extensive debate among academics, practitioners and policymakers (e.g. Lightman, 1996; Chew et al., 2004). The study of bankruptcy costs is important because it sheds important light on the efficiency of the bankruptcy process (Ferris and Lawless, 2000; Franks and Sussman, 2005). There is increasing recognition of the need to consider different types of firms in this context since their heterogeneity may also be reflected in the nature of the distress process and its outcomes (Ferris and Lawless, 2000; Franks and Sussman, 2005; Bris et al., 2004). A number of studies, primarily focused on public corporations in the US and Canada, show substantial variation in the direct costs of distress, although several suggest that the administrative fees in Chapter 11 bankruptcies have been of the order of 7.5% of the liquidation value of the bankrupt firm's assets (Ang et al., 1982; Weiss, 1990; Betker, 1997; Tashjian et al., 1996; Lubben, 2000; Fisher and Martel, 2001; Bris et al., 2004).

Andrade and Kaplan (1998) examine a sample of 31 formerly publicly listed corporations in the US that were taken private in highly leveraged transactions (HLTs) in which management obtained an equity interest and which subsequently became distressed. The costs of financial distress in these firms amounted to 10–23% of firm value. Betker (1997) finds that the ratio of direct costs of bankruptcy to assets for traditional Chapter 11 cases is lower if the firm is an HLT than for distressed firms in general and suggests that this is because HLTs reduce creditor coordination problems. Franks and Sussman (2005) provide detailed analysis of 542 small UK firms in bankruptcy and distress, concluding that the direct costs of bankruptcy appear to be relatively high, with a mean ranging between 24.3% and 42.4% (median 18.5% to 26.8%) of total bankruptcy proceeds. Franks and Sussman conclude that these costs are higher than those found by Thorburn (2000) for Sweden.

This paper extends analysis by focusing on the costs of the bankruptcy process related to management buy-outs (MBOs). MBOs have higher failure rates than firms generally.[1] They may provide a

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[1] On the basis of data in www.berr.gov.uk/files/file/10698.pdf, 'Companies in 2001–2002', specifically Tables A1 and C2, which we adjusted for the number of dormant companies, we estimate the overall annual receivership rate of all active companies to be about 0.2% in 2000. On the basis of Centre for Management Buy-out Research (CMBOR) data, the percentage of outstanding MBO/MBIs that failed in 2000 was 1.9% (104 receiverships divided by 5,474 non-exited deals). Since deals selected for buy-out are likely to be riskier than all active companies generally, because they are more likely to be underperforming and generally have higher leverage, a higher receivership rate is to be expected.

stronger test of the efficiency of the bankruptcy process for three main reasons. First, MBOs may help to shed light on the 'lazy banking' critique that over-secured creditors have little incentive to control the costs of the bankruptcy process (Manove et al., 2001; Franks and Sussman, 2005; Mokal, 2004). MBOs are typically highly leveraged and their banks are less likely to be over-secured than with other firms since there may be greater reliance on stable cash flows than asset security (Kaplan and Stein, 1993).[2] Second, MBOs shed light on the coordination costs in the distress process arising from the presence of more than one secured creditor and on whether senior secured lenders take advantage of other secured lenders. MBOs provide an interesting context in which to test hypotheses relating to the number of creditors since, unlike private firms generally in the UK (Franks and Sussman, 2005), many of them are financed by multiple lenders (Citron et al., 1997). MBOs will be more likely to involve multiple lenders since lenders will seek to spread the financial risk from the higher leverage. An additional incentive for this lending structure is provided by the heightened operational risk of MBOs due to the fact that these entrepreneurs will not have prior owner-manager experience. Third, in contrast to Franks and Sussman (2005) MBOs may be more highly leveraged. Following Jensen (1989), default should occur when more going concern value is preserved. Hence, it would be expected that MBOs will have lower costs of distress and more going concern sales when they enter distress than firms with lower leverage. A study of highly geared MBOs is particularly of current interest in view of the recent growth of highly leveraged private equity transactions. Regulators have highlighted excessive leverage and the associated high risks of default as one of the most significant risks arising from these deals (FSA, 2006). This research provides early evidence of the scale and determinants of bankruptcy costs likely to be incurred when such defaults occur.

We study bankruptcy costs for a sample of MBOs in receivership. Three dimensions of bankruptcy costs are examined. First, we examine the impact on creditor recovery rates of potential coordination costs arising from the presence of multiple lenders. Second, we analyse bankruptcy costs in the form of fees paid to the receivers plus other direct receivership costs. Finally, we consider the length of the receivership, which Bris et al. (2004) argue is a good indicator of the efficiency of the process, suggesting in particular that indirect

bankruptcy costs, such as bankruptcy's adverse impact in product and capital markets, increase with the time spent in bankruptcy.

To address these issues, we survey the population of MBOs in the UK completed in the period 1990–1995 that subsequently went into financial distress. Given the pattern of failures of MBOs, especially those in the cohort covered in this study (Figure 1), our sample companies generally involve smaller MBOs. We hand-collected a unique dataset specifically for this study from the records of the receivers involved in each case. The detailed nature of data collection has typically meant that sample sizes in studies of financial distress have been quite small, ranging from 11 (Warner, 1977) to 108 (Gilson, 1997) with a mean size of less than 50. An exception is the study by Franks and Sussman (2005) which used a sample of 542 firms. Accordingly, our main final set of 57 firms is in line with the majority of studies in this area.

We provide data on the receivership process and the financial characteristics of the firms in receivership. Our main conclusions do not support the argument that multiple lenders create inefficiencies resulting in significantly lower secured creditor recovery rates. However, an important new finding is that there is strong evidence that, when there are multiple secured lenders, the senior secured lender gains at the expense of other secured creditors. This finding extends previous research, showing that secured lenders take advantage of unsecured lenders. Our results also support the view that receivership costs do consume a significant percentage of the receivership proceeds. When trading costs incurred during the course of the receivership are excluded, mean direct receivership costs equal 30% of net receivership proceeds for our final sample of 57 firms with cost data. Continuing trading costs themselves comprise 29% of gross receivership proceeds. Also, the receivership process can be long drawn out, with an average length of 3.0 years for these 57 firms, and is substantially longer than this in a significant minority of cases. However, the bulk of the receiver's work of repaying secured debt is usually completed far earlier, with 95% of repayments being made on average within 1.9 years. In addition, we find some economic rationale for the level of receivers' fees and for length of receivership, although in common with both Ferris and Lawless (2000) and Bris et al. (2004) the cost findings vary depending on which measure of costs is used. With this caveat, we find that receivers' fees are positively related to the proportion of secured debt repaid, and also have some evidence to support the scale effect thesis that the relative significance of receivers' fees declines as firm size grows. Regarding receivership length, receiverships last longer the larger the amount of debt

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[2] Moir and Sudarsanam (2007) find that, in 1999, financial loan covenants for borrowers in general were predominantly non-cash flow based, consistent with lenders placing less reliance on cash flows for these borrowers.

Figure 1
Percentage of MBO/MBIs ending in receivership by deal value range and vintage year
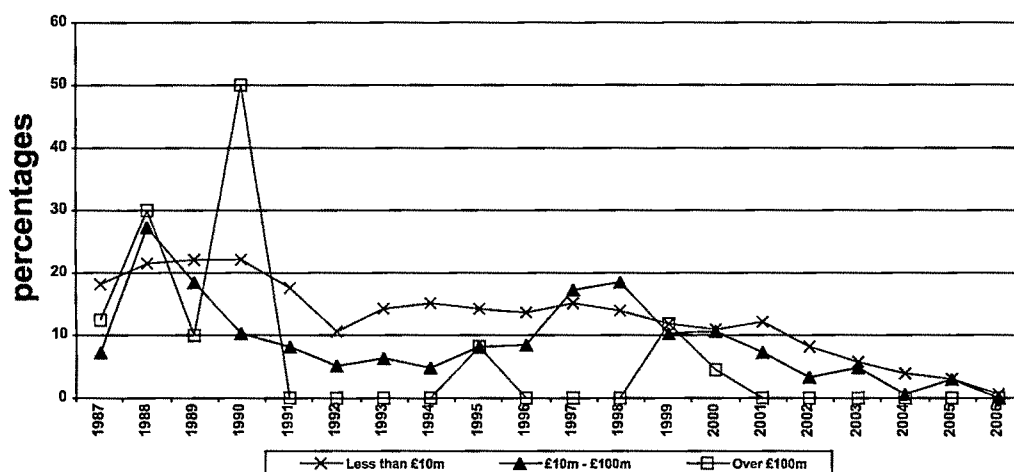
owed to the secured lenders.

The rest of this paper is organised as follows. The next section sets out the institutional context. Section 3 sets out the previous literature and hypothesis development, and Section 4 the data and methodology. Descriptive statistics are set out in Section 5. Section 6 contains our main results, followed by our conclusions.

2. Institutional framework

This study focuses on administrative receivership. The *Insolvency Act 1986* in the UK introduced court-administered procedures similar to Chapter 11 in the US. However, holders of floating charges, which are charges over assets that are changing in nature, such as stocks or work in progress, have the power to veto these procedures. Administrative receivership can be instigated only by a creditor whose security is held as a floating charge (Franks et al., 1996). Administrative receivers owe their main duty of care to the floating charge holder that appointed them; they have few obligations to others. A floating charge gives the holder powers of control but not priority in the disbursement of proceeds; this is provided by holding a fixed charge (Armour and Frisby, 2001; Mokal, 2003).

Importantly, the administrative receiver has complete control over the firm. This power includes the ability to liquidate the business without the permission of other creditors or the court. Fixed-charge holders, who are creditors who hold security over an identifiable corporate asset such as real estate and who have the right to realise their specific security in priority to any other claimants, can constrain the activities of the receiver. As a result of the different powers attached to each

charge, creditors typically ensure that they hold both fixed and floating charges (Sterling and Wright, 1990).

3. Previous literature and hypothesis development

Firms involved in MBO transactions are traditionally argued to have characteristics associated with incentive misalignment and poor monitoring prior to the buy-out, which results in significant agency costs (Jensen, 1986). High leverage in MBO transactions and its associated commitment to service the debt form a central part of the panoply of governance mechanisms aimed at reducing these agency costs, alongside managerial equity holdings and active private equity investors. There is a well-known agency cost involved in the provision of debt arising from potential conflicts of interest between equity holders and debt providers (Smith and Warner, 1979). These conflicts give rise to the need for lenders to monitor management, a requirement that extends to monitoring the administrative receivers who are in effect the management during any insolvency process (Armour and Frisby, 2001). A number of factors will affect the efficiency of this monitoring process, key among which is the number of secured creditors. The presence of multiple secured creditors will give rise to coordination problems, both before and after the firm enters insolvency. However monitoring efficiency can be improved either by there being only one secured creditor or, if there are multiple secured creditors, by concentrating control in the hands of a main creditor. On the other hand a single creditor, if over-secured, could result in poor control over bankruptcy costs, although the

creditor's desire to preserve its reputation may counter-balance this. Company size is a further variable to be taken into account as, thanks to scale effects, receiverships are likely to be more efficient the larger the firm.

The following sub-sections relate these issues to three dimensions of bankruptcy costs – the extent of inefficiency in secured debt recovery rates, the determinants of receivers' fees, and the length of the receivership process.

3.1. Number of secured creditors and recovery rates

The cost and efficiency of the receivership process may be affected by the number of secured creditors. Monitoring may be influenced by the number of secured creditors that are present in a particular deal (Bolton and Scharfstein, 1996; Dennis and Mullineaux, 2000). The presence of multiple creditors exacerbates information costs and may result in collective under-investment in information-gathering. In conditions of financial distress, difficulties in getting agreement among multiple secured creditors to sell may increase the sale price required to persuade them to sell. However, this may be more than offset by the unwillingness of potential bidders to sink the costs of becoming informed about the firm's assets. The greater the number of lenders in a loan syndicate, the greater the potential conflicts of interest among claim-holders (Wruck, 1990), the greater the renegotiation costs associated with default (Smith, 1993) and the less likely private renegotiation of financial distress is to be successful (Gilson et al., 1990). Lee and Mullineaux (2004) find, using evidence from listed corporations, that syndicates are small and more concentrated when there is little information about the borrower, when the credit risk is relatively high and when the loan is secured, so that syndicates tend to be structured to enhance monitoring efforts and to facilitate renegotiation in distress.

Multiple creditors

MBOs offer a particularly interesting context to examine the impact of multiple secured creditors on the efficiency of the bankruptcy process since they are more likely than other private firms to have multiple secured lenders. Jensen (1989) suggests that because in MBOs lenders often hold claims across seniority classes, the coordination of multiple creditors may be reduced as compared to non-buy-out cases, although this benefit may be lower where public high yield debt is used (Kaplan and Stein, 1993; Betker, 1997).

Where the presence of multiple secured lenders to an MBO takes the form of a syndicate all primary contacts with the client are generally channelled through the lead (agent) bank so that

syndicate members have less influence on monitoring (Citron et al., 1997). This may lead to significantly longer delays in implementing action than in single creditor lending to buy-outs (Citron et al., 1997). Such actions may also be less effective as a result of these greater coordination costs. A multiplicity of secured creditors in buy-outs may, therefore, lead to delayed corrective action prior to receivership and adversely affect the conduct of the receivership when it occurs compared to single creditor cases. Furthermore if different creditors have different and possibly conflicting priorities and objectives, the variety of pressures on the receivers and the accompanying coordination problems may raise the costs of the bankruptcy process and also result in a lower overall rate of payout to the body of secured creditors.

Single creditors

Single secured creditors may avoid the coordination and other costs associated with multiple lenders; thus they may be expected to lead to higher recovery rates and lower bankruptcy costs. However, a single secured creditor may exercise poorer control of receivers' fees provided the creditor obtains a reasonable repayment whereas the presence of more than one secured creditor may lead to more effective monitoring of receivership costs and also the eventual amount of debt repaid.

Main secured creditors

It is possible to alleviate some of the coordination problems arising from multiple lenders through creditor concentration where the main creditor has the incentive to invest in monitoring and the power to enforce default and renegotiation (Diamond, 1984). This may lead to cheaper and quicker enforcement and hence increase expected returns to creditors. This main creditor role would typically be undertaken by a bank. However, as the main creditor bears a larger part of the total risk of a firm's failure, the benefits of concentration may be outweighed by the costs, the larger the firm is. Administrative receivership in the UK can be seen as an efficient means of facilitating the bankruptcy process by a concentrated creditor (Armour and Frisby, 2001).

The role of the main secured creditor is especially important because the various strips of secured debt finance in MBOs may be provided by different types of lender (Jensen, 1989; Wright et al., 1991). These strips may involve different priorities and charges over assets. The presence of multiple secured lenders may mean that an asset has more than one floating charge over it. Priority among equitable charges where the equities are otherwise equal follows the rule in *Dearle v Hall* and the first in time prevails (Farrar and Hanningan, 1998). Hence, in the event of bankruptcy, if there is a

shortfall in the proceeds from the sale of the asset, later creditors may not receive as great a repayment proportion as earlier ones. The main creditor is likely to be the creditor that holds the first charge over the assets.

We examine whether multiple lenders create inefficiencies that result in significantly lower secured creditor recovery rates and control for other factors that are likely to affect these recovery rates. Where a firm may be operationally viable under new ownership, a going-concern sale is more likely and, in such cases, the receiver is expected to be able to make higher payments to secured creditors than where the assets are sold piecemeal. In addition it is expected that repayments will be higher, the lower the proportion of inventories to total assets, since inventories tend to be firm-specific and relatively illiquid, and the less weak the MBO's financial structure. Due to the greater restructuring complexities associated with larger MBOs, we expect firm size to be negatively associated with secured creditor repayments. Finally, the greater liquidity of the market for corporate assets during times of economic growth suggests that repayments will be higher during economic upswings (Shleifer and Vishny, 1992; Franks and Torous, 1994).

3.2. Determinants of receivership costs

Previous bankruptcy cost studies have investigated the determinants of costs scaled by firms' assets, claims and bankruptcy distributions (Ferris and Lawless, 2000; Bris et al., 2004). A number of studies that have found scale effects have been limited in terms of sample size and sector covered. Warner (1977) found evidence of a scale effect but this study was limited to only 11 firms in the railroad industry. Guffey and Moore (1991) also found evidence of a scale effect in their study of the trucking industry, while Ang et al. (1982) find a scale effect in a sample of firms based on one judicial district. In contrast, Weiss (1990) in a more comprehensive study of publicly traded corporations found no evidence of a scale effect to bankruptcy costs.

Asset-based results are often considered less robust, possibly because asset valuations are less reliable (Ferris and Lawless, 2000: 9). This study looks at receivers' fees both in total and scaled by three alternative size measures – (i) by the amount of secured debt due at the start of the receivership; (ii) by the net proceeds of the receivership defined as repayments to the secured creditors plus receivership costs (a measure similar to that used by Franks and Sussman, 2005). Receivership costs comprise disbursements for receivers' fees plus other direct receivership costs such as legal, agents' and valuers' fees. Salaries and other trading expenses incurred by the receiver are ignored on the grounds that they are not strictly incremen-

tal; and (iii) by the gross proceeds of the receivership which includes salaries and other trading costs, as the amounts involved are large and are likely to vary depending on the manner in which the receivership is managed. The first scaled measure is used as an indicator of the size of the task facing the receiver (an 'input' measure) and the latter two as measures of the results of the receivership (an 'output' measure).

Mode of sale

Fees are expected to be related to the mode by which the receiver is able to dispose of the company. Asset fire sales may depress the price at which assets are sold (Pulvino, 1998; Stromberg, 2000). LoPucki (1983) suggests lower prices from piecemeal disposals as firms that reorganise rather than liquidate lead to greater repayment of debt. Selling firms as going concerns may generate higher prices. Going-concern sales may take place quickly, so associated costs should be lower. However, disposing of a firm that has entered receivership may require the expenditure of effort to repackage the firm to enable it to be sold as a going concern. Further significant costs may then be involved in searching for and agreeing a price with a purchaser who is convinced that the firm is indeed viable. In contrast, selling assets piecemeal may be less problematical in the presence of active markets for assets.

Firm size

Fees are expected to be higher the larger the MBO. Larger MBOs are likely to be more complex, so resulting in higher fees. However, as firm size grows, scaled fees are expected to fall due to efficiencies in the conduct of larger receiverships and possibly the presence of fixed cost elements in the make-up of receivers' fees. This is the 'scale effect' hypothesis for which there is only limited evidence in previous research (Ferris and Lawless, 2000, and previous studies cited in their note 76).

Number of secured creditors

In the previous section we discussed how a multiplicity of secured creditors could adversely affect the costs of the receivership. However, in a market involving repeated transactions between a limited number of players, reputation is important (Black and Gilson, 1998). Lead members of lending syndicates, as agents for the other members, may be under greater pressure to act efficiently in order to maintain their reputation (Chemmanur and Fulghieri, 1994). Failure to do so may make it difficult to attract syndicate members in subsequent transactions. Hence, receivership fees may not be significantly higher with multiple secured creditors.

Type of receiver

More expert receivers with greater reputations,

such as members of major international account-
ing firms,[3] may be able to conduct the process
more efficiently and so charge lower fees, both in
total and on a scaled basis.

Length of receivership

Receivers' fees (the main component of re-
ceivership costs – see Table 3) are often time-
based (Lightman, 1996). In addition other direct
receivership costs may be expected to mount up as
a receivership continues. In support of this, Bris et
al. (2004), Franks and Sussman (2005) and
Thorburn (2000) find a link between time spent in
bankruptcy and cost of bankruptcy.[4] Therefore a
positive relation is expected between fees and
length of receivership.

State of the economy

The liquidity of markets for corporate assets will
be reduced in times of recession (Shleifer and
Vishny, 1992; Franks and Torous, 1994). Both the
cash flow and the number of potential industry
buyers will be lower, so that more effort will be re-
quired on the part of the receiver to achieve an
asset realisation price close to their value in best
use. As a result we expect receivership costs to be
higher in times of recession.

Proportion of secured debt repaid

The lazy banking hypothesis implies that credi-
tor banks fail to adequately control bankruptcy
costs. This will especially be the case when banks
are over-secured as they will then expect to recov-
er a high proportion, if not all, of their debt irre-
spective of the level of costs incurred. This view is
in line with Franks and Sussman's (2005) conclu-
sion that the relatively high direct costs of bank-
ruptcy in the UK are consistent with the lazy
banking thesis that banks have little incentive to
control costs once their own liquidation rights
have been secured. We investigate this thesis for
our sample of highly leveraged MBO firms with
which banks are less likely to be over-secured. For
such firms, therefore, we expect the banks to be in-
centivised to control receivership costs. This effi-
ciency argument implies that costs are not
excessive but are based to some degree on the ef-
fectiveness of the receivership and that there
should therefore be a positive relation between
costs and the proportion of secured debt repaid.

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[3] At the time of our study, this group involved the Big Six
firms but this has now been reduced to the Big Four.

[4] However, Ferris and Lawless (2000) find only a weak pos-
itive relation in the US between time in reorganisation and
bankruptcy costs.

[5] These surveys generally obtain a 100% response rate from
all the financiers active in the buy-out market as they receive
a free copy of a quarterly review of aggregate market trends
based on the data they supply which is recognised as the lead-
ing source of information in the market.

3.3. Determinants of length of receivership

We have the following expectations regarding
the determinants of receivership length.

Mode of sale

The length of receivership is expected to be re-
lated to the mode by which the receiver is able to
dispose of the company. Going-concern sales may
take place more quickly. However, repackaging a
firm so that it can be sold as a going concern and
identifying a suitable purchaser is likely to be
more time-consuming than selling assets piece-
meal where there are active markets for assets.

Number of secured creditors

As with receivers' fees above, coordination
problems with more than one secured creditor may
be expected to lead to longer receiverships. On the
other hand, if multiple creditors are able to exer-
cise more effective control, then they may be asso-
ciated with shorter receiverships.

Proportion of secured debt repaid

If longer receiverships are associated with
greater inefficiencies and complexities, then they
will also be associated with lower rates of secured
debt repayments.

Amount of secured debt due at start of receivership

Bris et al. (2004) provide weak evidence that
larger bankruptcies take longer to complete. We
therefore expect that the greater the amount of debt
due at the outset of the receivership, the longer the
receivership is expected to last.

State of the economy

It is expected that the liquidity of markets for
corporate assets is likely to be reduced in times of
recession (Shleifer and Vishny, 1992; Franks and
Torous, 1994), thus making it harder for receivers
to realise assets at prices they would like to
achieve. Due to these difficulties characteristic of
recessions, receiverships commencing during peri-
ods of economic downturn are expected to take
longer to complete.

4. Data and methodology

The study involved the compilation of a novel
dataset of MBOs completed in the period 1990 and
1995 that had subsequently entered receivership.
This period was selected as it allowed sufficient
time for failures to emerge and for the completion
of the receivership process in a significant propor-
tion of cases. The Centre for Management Buy-out
Research (CMBOR) database was used to identify
the cohort of buy-outs. The CMBOR database is
compiled from a wide range of sources including
twice-yearly surveys of private equity and debt
providers to buy-outs,[5] press releases by these fin-

anciers, the financial press, stock exchange circulars issued by companies divesting subsidiaries as MBOs and companies' annual reports. The database has no lower size cut-off and is unique in effectively representing the universe of buy-outs in the UK. Data on failures of buy-outs and buy-ins are collected by CMBOR from its regular surveys of participants in the buy-out market, Companies House returns and Extel, monitoring of the financial press and the *London Gazette*.

From Companies House we obtained microfiches for 226 of the 402 MBO receivership cases identified on the CMBOR database. The total of 402 receiverships represents 11.7% of the 3,436 buy-outs identified by CMBOR in this period.[6] Of these, 161 were found to be unsuitable for analysis for a number of reasons such as lack of data on appointment of the receiver or absence of receivers' receipts and payments accounts; receiver appointed very recently; some cases of voluntary liquidations; problems with establishing correct company identity; or the receivership was still continuing at the time our analysis was undertaken and it was likely that further amounts would be realised for the secured creditors. We therefore identified 65 cases where the receivership process was complete but of this total, cost of receivership data were not available for eight firms. The detailed direct cost analysis in this paper, therefore, relates to the remaining 57 cases where the receivership process was complete, with the company having been struck off or, while technically continuing, the receiver had filed the final receipts and payments accounts or the receivers informed us directly that the receivership was effectively complete.

Data on the number of secured creditors and the amounts owing to each are obtained from the directors' Statements of Affairs. All amounts due to secured creditors include accrued interest. The mode of sale of the MBO by the receivers and the identity of the receivers are obtained from the re-

ceivers' report to the creditors. The amount of secured debt repaid by the receivers, the receivers' fees and the on-going trading expenditures are determined from the receivers' annual receipts and payments accounts. The value of the MBO at the date it is set up is taken from the CMBOR database or from the value of total assets less current liabilities from the first published balance sheet subsequent to the MBO being established.

Accounting data from the MBOs' published financial statements are available for only a subset of 42 cases in our population. Where more than one set of accounts is available, the last set prior to the appointment of the receivers is used.

5. Descriptive statistics

As shown in Table 1, the period until formal termination of the receivership is no longer than three years in the majority (63%) of cases. In some cases, however, this period can be substantially longer and in 10% of our 65 cases it exceeds six years. Table 2 (which covers the 57 cases for which we have full data for our costs tests) shows, however, that very little significant activity occurs beyond year three in terms of secured debt repayment, payment of receivers' fees and other direct receivership costs, or the incurring of trading costs by the receiver. By the end of the third year, on average 98.3% of debt repayments have been made, 92.8% of fees and 96.3% of other receivership costs have been paid and 92.6% of trading costs have been disbursed. Due to the lack of apparent activity in the later formal years of lengthy receiverships, in some tests we use an alternative indicator to measure the 'effective' length of the receiverships. This is deemed to be the year by which 95% of the secured debt repayments have been made. Table 1 shows that almost one-half of the 65 receiverships are effectively completed according to this measure during their first year, and 89.2% are completed in this sense by year three.

Direct receivership costs are evaluated both in relation to the amount of secured debt owing at the start of the receivership, which can be viewed as a measure of the size of the job facing the receivers at the outset, and in relation to receivership proceeds, which is used as a measure of output from the receivership process. Receivership proceeds comprise payments to the secured creditors plus receivers' fees and other direct receivership costs,[7] with alternative measures either including (gross proceeds) or excluding (net proceeds) on-going trading expenditures, as explained in Section 3.2 above.[8] Receivers' fees plus other direct receivership costs are equivalent to just over one-quarter of secured debt owing (Table 3, Panel A) and account on average for 30% of net receivership proceeds (Table 3, Panel B), which is within the range found by Franks and Sussman (2005).[9] After allowing for

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[6] Some 26 of the buy-outs completed in this period involved public to private transactions (0.8%), of which six had entered receivership by the end of 2006. See footnote 1 for details of overall receivership rates compared to overall MBO receiverships.

[7] Other receivership costs total £43,600 on average (median £23,600), with legal fees accounting for 61.5% of these, agents' and valuers' fees 29.6% and receivers' expenses, including advertising, 8.9%.

[8] Repayments to preferential creditors are not included due to lack of reliable data. Franks and Sussman (2005) have these data for only part of their sample, and for these cases payments to the preferential creditors amount on average to only 4.9% (median = 1.1%) of total proceeds. To this extent, therefore, our measures of receivership costs to total proceeds may be overstated.

[9] Our finding of direct receivership costs comprising 30% of net receivership proceeds (i.e. of liquidation value) contrasts with only 19.1% reported on the same basis by Thorburn (2000) in Sweden where the regime is somewhat different.

Table 1
Length of receivership

This table identifies the number and percentage of companies where the receivership has been completed by year. We distinguish between actual and effective length of receivership. Effective length of receivership is defined as elapsed time by which 95% of secured debt is repaid.

	Actual length of receivership		Effective length of receivership	
No. of years	No. of cases	% of cases	No. of cases	% of cases
1	2	3.1	31	47.7
2	22	33.8	21	32.3
3	17	26.1	6	9.2
4	7	10.8	2	3.1
5	5	7.7	3	4.6
6	5	7.7	2	3.1
7	3	4.6	0	0.0
8	3	4.6	0	0.0
9	0	0.0	0	0.0
10	1	1.5	0	0.0
Total	65	100.0	65	100.0

Table 2
Receivership activity over period of receivership

This table identifies the mean percentages of secured debt repaid, receivers' fees and other receivership costs paid and trading costs paid in each year of the receivership.

Year	Mean percentage of secured debt repaid in year	Mean percentage of receivers' fees paid in year	Mean percentage of other receivership costs paid in year	Mean percentage of trading costs paid in year
1	73.7	69.4	77.5	79.3
2	17.0	17.7	13.0	9.8
3	7.6	5.7	5.8	3.5
4	0.9	3.2	0.3	2.2
5	0.5	0.2	1.4	1.4
6	0.3	1.2	2.0	0.9
7	0.0	0.1	0.0	0.2
8	0.0	2.3	0.0	2.3
9	0.0	0.2	0.0	0.2
10	0.0	0.1	0.0	0.1

N=57

receivership and other fees, secured debt repaid amounts to a mean of 70% of net proceeds. Other continuing trading disbursements are particularly high, accounting for a mean of 51.4% and a median of 23.9% of total secured debt, with a mean of 56.9% and a median of 49% of total secured debt being repaid (Table 3, Panel A). Continuing trading disbursements also account for 28.6% of gross receivership proceeds, leaving approximately one-half of both the mean and median gross proceeds for the secured creditors (Table 3, Panel C). Illustrative examples of the nature of receivers' on-

going trading costs are shown in the Appendix.

As shown in Table 4, which encompasses the companies with accounting data, the last accounts prior to entering receivership not surprisingly show these firms to have only a marginally positive median return on assets (2%) and a median interest cover well below one (0.79). Ninety percent of assets are funded by liabilities, and liquidity is poor with a median acid test ratio value of only 0.68. Median fixed assets and debtors both account for about 30% of total assets and the median value of stocks to total assets is 21%. These assets could

Table 3
Receivership costs

Panel A analyses the percentage of total secured debt due accounted for by receivers' fees, other receivership costs, receivership trading costs and repayment of secured debt. Panel B analyses net receivership proceeds between receivers' fees, other receivership costs and secured debt repayments. Panel C analyses gross proceeds among receivers' fees, other receivership costs, receivership trading costs and secured debt repayments.

Panel A. As a percentage of total secured debt due

	Mean	Median
Receivers' fees	19.4	13.7
Other receivership costs	6.7	4.8
Receivership trading costs	51.4	23.9
Repayment of secured debt	56.9	49.1

Panel B. As a percentage of net receivership proceeds

	Mean	Median
Receivers' fees	22.3	19.9
Other receivership costs	7.7	6.0
Repayment of secured debt	70.0	73.5
	100.0	

Panel C. As a percentage of gross receivership proceeds

	Mean	Median
Receivers' fees	15.1	14.6
Other receivership costs	5.2	4.4
Receivership trading costs	28.6	27.9
Repayment of secured debt	51.1	50.4
	100.0	

N=57

potentially provide security for further borrowings by these firms, but it should be remembered that all the firms already have secured debt and data are not available on the proportion of free assets still available.

Table 5 provides additional descriptive statistics on the sample and indicates the distinctiveness of MBOs.[10] Franks and Sussman (2005) show mean recovery rates for their three banks ranging between 73.8% and 76.7%. We have a much lower mean recovery rate at 57% (Table 5, Panel A). Also in contrast to Franks and Sussman who find that for one of their banks the median recovery rate is 100%, in only 14 (25%) of our cases do the se-

cured creditors get a 100% repayment, indicating that over-security does not seem to be widespread. Also 20 (35%) cases have more than one secured creditor, whereas Franks and Sussman's companies tend to have only the one 'main' bank. Over two thirds (70.2 %) of firms were sold piecemeal with the balance being sold either as a going concern (10 cases, 17.5%) or part going concern and part piecemeal (7 cases, 12.3%). Scoring a partial going-concern sale as half, the overall rate of going-concern realisations is 24%, substantially lower than the 44% found by Franks and Sussman (2005). Median receivership costs in those firms sold piecemeal were significantly smaller (but only weakly so, at the 10% level) than for other forms of sale (Table 5, Panel B). The companies are evenly divided in terms of whether the receiver was part of a major international (Big Six) accounting firm.[11]

6. Results

6.1. Cost impact of number of secured creditors

6.1.1. Univariate analysis

We first investigate the identities of the secured creditors for the 57 cases with data availability. As

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[10] The differences reported here between this study and Franks and Sussman (2005) may also be due to this research including exclusively firms in receivership while only 55% of Franks and Sussman's bankrupt firms entered receivership, with the remainder entering administration, CVA or winding-up (see their Table IV, p. 83). However Franks and Sussman also report that they have not identified significant differences in recovery rates between insolvency procedures, although they also point out that banks are unlikely to permit procedures other than receivership unless they expect them to generate higher recovery rates.

[11] See explanation in footnote 3.

Table 4
Financial characteristics of the firms in receivership

This table presents data on means, median, minimum, maximum and standard deviation of financial variables used in the analysis. Sample size varies due to missing values of some variables.

	N	Mean	Median	Minimum	Maximum	Standard deviation
Sales (£000s)	28	8945	4009	291	42201	10488.65
Total assets (£000s)	42	3612	1852	107	30212	5075.99
Operating profit/total assets	31	–0.02	0.02	–0.39	0.19	0.14
Interest cover	30	–2.80	0.79	–70.75	14.10	16.74
Total liabilities/total assets	42	0.92	0.90	0.47	2.19	0.32
Shareholders' funds/total assets	42	0.08	0.10	–1.19	0.53	0.32
Current ratio	42	1.08	1.01	0.21	3.58	0.53
Acid test ratio	42	0.71	0.68	0.10	1.62	0.33
Fixed assets/total assets	42	0.34	0.29	0.00	0.88	0.23
Debtors/total assets	21	0.40	0.31	0.14	0.95	0.23
Stocks/total assets	42	0.21	0.21	0.00	0.69	0.17

Table 5
Descriptive statistics of variables associated with the receivership

Panel A in this table presents data on means, median, minimum, maximum and standard deviation of descriptive statistics associated with receivership. Size of firm is measured in Size of firm = value of MBO at date it was established or, if this not available, balance sheet value of total assets minus current liabilities. Panel B presents analysis of differences in mean and median receivership fees plus direct receivership costs according to mode of sale, number of secured creditors, size of receiver and amount of secured debt repaid. * = difference in means (weakly) significant at 10% level (two-tail test) using t test; difference in medians (weakly) significant at 10% level using the Mann Whitney test.

Panel A: Firm size, receivership length, debt repaid

	Mean	Median	Minimum	Maximum	Standard deviation
(n=57)					
Size of firm (£000s)	1938	650	4	16315	3273.18
Receivership length (days)	1101	877	9	3316	680.88
Effective length of receivership – year by which 95% of secured debt repaid	1.93	2.00	1.00	6.00	1.22
Proportion of secured debt repaid	0.57	0.49	0.01	1.00	0.34

Panel B: Differences in receivership costs (fees plus direct receivership costs) (£000s)

		Receivership costs	
	N	Mean	Median
Going concern or mixed sale	17	210.7*	115.0*
Piecemeal sale	40	129.8*	74.7*
One secured creditor	37	152.4	101.0
More than one secured creditor	20	156.7	95.0
Big Six receiver	29	141.4	114.9
Non-Big Six receiver	28	166.8	69.3
100% of secured debt repaid	14	174.2	95.4
Less than 100% of secured debt repaid	43	147.3	100.4

Table 6
Identities of main secured lender

This table compares the relative importance of different secured lenders among our sample of receivership cases with their rank in terms of all MBO deals completed. Rank of secured lenders by volume of deals done is based on authors' database of the population of buy-outs in the UK during this period, where 1 = most deals done.

Secured lender	Cases		Rank by volume of MBO deals 1990–1995
	Number	%	
Barclays	15	26.3	3
Natwest	11	19.3	2
Lloyds	9	15.8	4
Midland	6	10.5	6
Bank of Scotland	4	7.0	1
Royal Bank of Scotland	4	7.0	5
Sub-total	49	85.9	
Other banks (all one deal each)	8	14.1	
Total	57	100	

already referred to in Table 5, 37 of these cases have a sole secured creditor. In the remaining 20 cases, the senior secured lender is identified. In 15 of these cases the creditor classified here as the senior secured lender was the first creditor to legally register its security and also the first appointer of the receiver, and as such would be expected to have priority in repayment. In a further three cases the first appointer of the receiver (which in none of the cases was one of the top six MBO lenders during the 1990 to 1995 period)[12] had entered into an agreement with one of the most active MBO lending banks to give that bank repayment priority up to a specified sum in case of receivership. In these three cases the bank benefiting from the priority agreement is classified here as the senior secured lender.[13] Finally, in the remaining two cases the senior secured lender is identified as a creditor holding a fixed charge over specific assets and to whom only a very small proportion (less than 2% in both cases) of the total outstanding secured debt is due. In both these cases the senior secured lender is one of the active MBO lenders, while the appointer of the receiver is not. In summary, the creditor classified here as the senior secured lender is either the first to ap-

point the receiver or one of the main MBO lending banks which has protected itself in case of receivership either via a priority agreement with other secured creditors or, when the debt due is relatively small, by a fixed charge.

Table 6 shows the identities of the 57 main secured lenders, these being either the sole secured creditor or the senior secured lender (as defined above) in multiple secured creditor cases. As can be seen in 49 (86%) of the 57 cases, the senior secured lender is one of the top six MBO lenders during the 1990 to 1995 period. There are a further 26 secured lenders (in addition to the main lender) in the 20 multiple creditor cases, among whom only one name appears more than once, and with only one appearance in this group by one of the top six MBO lenders. It is thus clear that the large banks and foremost MBO lenders are predominantly either the sole or the senior secured lender to these MBOs.

As shown in Table 7, the mean repayment rate of 62% to sole secured creditors is, as expected, greater than the overall repayment rate of 48% in cases with more than one such creditor, a difference that is weakly significant at the 10% level (t = 1.587, p = .060 one-tailed test). Although the overall repayment rate is lower in multiple secured creditor cases, the senior secured lender in these cases receives more (mean = 74%) than do single secured creditors (mean = 62%), although this difference is not significant (t = −1.473, p = .147, two-tailed). There is also no significant difference between these groups on the basis of medians. Of particular interest, however, is the finding that in multiple creditor cases there is a highly significant

[12] This ranking is based on an analysis of 1,550 MBO deals that took place during this period (CMBOR analysis).

[13] In one case, for example, the private equity backer which had also provided debt appointed the receiver. The receivers' report to the creditors states: 'There is a priority agreement in force between the two debenture holders which ranks [Creditor A] ahead of [Creditor B, the private equity backer]. [Creditor A] have now been paid in full and there is an estimated deficiency to [Creditor B] of £156,711.'

Table 7
Secured debt repayment rates

This table compares differences in secured debt repayment rates between single secured creditors and multiple secured creditors. Significant differences in means and medians are identified as: a = difference in means between single secured creditor and all secured creditors in total significant at 0.10 level using t-test; b = difference in means between main secured creditor and other secured creditors significant at 0.000 level; c = difference in medians between main secured creditor and other secured creditors significant at 0.001 using Wilcoxon signed ranks tests).

| | Proportion of secured debt repaid | |
	Mean	Median
In cases with a single secured creditor (n = 37)	.618[a]	.69
In cases with more than one secured creditor (n = 20):		
In total	.479[a]	.38
To main secured creditor	.744[b]	.83[c]
To other secured creditors	.317[b]	.18[c]

difference between the mean 74% recovered by the senior secured lender and that received by the remaining secured creditors (mean = 32%) (t = 5.941, p = .000, one-tailed). This difference is even more marked and strongly significant when using median figures: 83% median recovery by the senior secured lender compared with 18% median recovery by the remaining secured creditors

6.1.2. Multivariate analysis

In Tables 8, 10, 11 and 12, we adopt OLS regression analysis. In Table 9 we undertake logistic estimation. We conduct tests for the normality of standardised residuals using the Shapiro-Wilks and Kolmogorov-Smirnov tests.[14]

Table 8 examines the relationship between the number of secured creditors and amounts repaid to these creditors, both in total (model 1) and to the senior secured lender alone (model 2). These regressions are for the 42 cases for which accounting data are available. Although the overall regression is not significant, model 1 indicates that the number of secured creditors has no impact on the overall amount of secured debt repaid, and is therefore not shown to be a factor leading to greater ineffi-

ciency in the receivership process. However, going concern sales do marginally (one-tailed test) lead to higher repayments, as does a lower ratio of stocks to total assets.[15] In contrast, model 2 confirms that the percentage repayment to the senior secured lender is significantly larger in cases where there is more than one secured creditor. However, the mode of sale is of no effect although, contrary to expectations, there is some evidence that recoveries by the senior secured creditor are greater when the receiver is appointed in 1993 or earlier, a period of economic downturn. This may be because the senior creditor is more alert during times of recession and initiates receivership earlier so as to have a chance of achieving a greater recovery. The main overall conclusion from these two models is, therefore, that in our sample of MBO receiverships the number of secured creditors does have a significant impact on the way in which the total proceeds are apportioned among the various secured creditors. When there is more than one secured creditor, the senior secured lender appears to achieve a significant priority, due to the stronger nature of their security, and even to some extent receives a higher rate of repayment than do single creditors. There is also weak evidence from model 1 that the number of secured creditors does not affect the overall efficiency of the process.

6.1.3 Determinants of number of secured creditors

To gain a further understanding of the different repayment patterns for MBO receiverships with more than one as compared with only one secured creditor, a logistic analysis is performed to examine the variables associated with the presence of more than one such creditor. As can be seen from

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[14] Neither test indicates a problem with non-normally distributed residuals in the reported regressions, with the exception of Table 10 model 2 and (marginally) Table 11 model 1 for which only the Kolmogorov-Smirnov test indicates no problems.

[15] In addition, the mean recovery rate for 'speedy' going concern realisations is compared with that for 'slow' going concern realisations to test for possible dissipation in value among 'slow' cases. The mean realisation rate for the eight cases completed faster than the median receivership length is 69.7%, compared with 63.7% for the nine cases taking longer than the median length, but this difference is not statistically significant (t = 0.346, p = .734 two-tailed test).

Table 8

Association between number of secured creditors and proportion of secured debt repaid

Dependent variable is proportion of secured debt repaid: In model 1: to all secured creditors. In model 2: to only the senior secured lender. SALEMODE = 1 if going concern or mixed sale; = 0 otherwise. LOGSIZE = natural log of value of MBO at date it was established or, if this not available, of balance sheet value of total assets minus current liabilities. MULTCRS = 1 if more than one secured creditor; = 0 otherwise. STOCKTA = stock/total assets in last balance sheet prior to receivership. SHFUNDTA = shareholders' funds/total assets in last balance sheet prior to receivership. ECON = 1 if receiver appointed in 1994 or later; = 0 if appointed in 1993 or earlier. Figures in parentheses are p values.

Variable	Predicted sign	Model 1	Model 2
Number of cases		42	42
Intercept	?	0.869	1.002
		(.000)	(.000)
SALEMODE	+	0.159	0.044
		(.145)	(.651)
LOGSIZE	–	–0.022	–0.023
		(.466)	(.396)
MULTCRS	–	–0.077	0.252
		(.494)	(.017)
STOCKTA	–	–0.573	–0.586
		(.075)	(.047)
SHFUNDTA	+	0.184	0.203
		(.271)	(.183)
ECON	+	–0.118	–0.218
		(.385)	(.082)
Adjusted R^2		0.100	.222
F		1.759	2.947
F (sig)		0.137	.020

Note: The highest correlation among the independent variables is –0.187 between MULTCRS and SHFUNDTA.

Table 9, the presence of more than one secured creditor is significantly associated with both heavier reliance on liabilities for funding (i.e. low ratio of shareholders' funds to total assets) as well as with higher proportions of fixed assets to total assets. It seems, therefore, that MBOs seek secured lending from more than one source when they need to borrow a higher proportion of their total funding and they have substantial amounts of fixed assets against which they can offer appropriate security to lenders.

6.2. Determinants of receivers' fees and other receivership costs

As shown in Table 10, there appears to be some economic rationale for total receivership costs. Costs, as measured by the log of total receivership costs, are significantly higher the greater the proportion of secured debt repaid. In cases where 100% of the secured debt is repaid there is weak evidence of an association with higher costs. These results are consistent with the efficiency ar-

gument that high costs do not come at the expense of secured creditor recoveries. In addition, higher receivership costs are significantly associated with larger MBOs and with longer receiverships, as measured by the log of receivership days, although only weakly so in model 2. There is also some weak evidence that the presence of a going concern element in asset realisations is associated with higher total cost levels. Contrary to expectations, however, receiverships commencing in the post-1993 economic growth period are significantly associated with higher total cost levels.[16]

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[16] As a robustness check the regressions in Table 10 are rerun substituting the effective length of the receivership (the year by which 95% of the secure debt is repaid) for the actual length. Both regressions remain significant, with the coefficients relating to proportion of secured debt repaid, size of MBO and going-concern asset realisations all retaining their significance. The coefficient on effective receivership length is significant only in model 1 (at the 5% level), indicating that not only actual but also effective receivership length has some association with higher receivership costs.

Table 9
Variables associated with number of secured creditors

This table uses logistic regression to analyse the factors associated with the number of secured creditors. Dependent variable = 1 if more than one secured creditor, = 0 otherwise; SHFUNDTA = shareholders' funds/total assets in last balance sheet prior to receivership; FIXASSTA = fixed assets/total assets in last balance sheet prior to receivership; CURRENT = current ratio in last balance sheet prior to receivership; DUETOT = total amount of debt due to the secured lenders. Figures in parentheses are p values.

Variable	Predicted sign	Model
Number of cases		42
Intercept	?	–4.372
		(.036)
SHFUNDTA	–	–3.168
		(.033)
FIXASSTA	+	5.074
		(.043)
CURRENT	?	2.418
		(.099)
DUETOT	+	0.000
		(.692)
Model chi square		8.484
Chi square sig.		0.075
Nagelkerke R^2		0.254

Note: The highest correlation among the independent variables is –0.503 between FIXASSTA and CURRENT.

Regarding the scaled cost models presented in Table 11, there is strong evidence, particularly in model 3, for a scale effect, with the proportion of costs falling as firm size grows. In addition, as shown in model 1, receivership costs increase as a proportion of secured debt due, the greater the proportion of that debt repaid, providing further support for the efficiency argument that where receivership costs constitute a higher proportion of the debt due this does not occur at the expense of the secured creditors.[17] Finally in models 2 and 3 the proportion of costs is significantly higher in cases of only one secured creditor as compared

with cases having more than one secured creditor.[18]

6.3. Determinants of length of receivership

Longer receiverships, as measured by the log of the number of days, are as expected associated with both a larger amount of secured debt owing and with receiverships commencing during the pre-1994 recession period (Table 12). Further investigation reveals that this economic cycle result is entirely due to cases with piecemeal asset realisations. The ten pre-1994 recession period piecemeal realisation cases lasted over 80% longer than the subsequent 34 growth-period piecemeal receiverships (mean length = 1,803.0 days versus 982.5 days, t = 2.777, p = .017). While the going-concern/mixed realisation receiverships commencing during the recession period also lasted longer than the growth period cases, the difference is not statistically significant (for the six pre-1994 cases mean length = 1,203.2 days versus 1,033.5 days for the 15 post-1993 cases, t = 0.620, p = .543). It appears that it is piecemeal asset sales that take significantly longer to achieve in times of recession, while the time required for going-concern realisations is unaffected by the economic cycle. This could be because, in a recession, the piecemeal realisation cases have been previously offered for sale on a going-concern basis, but this

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[17] The negative association, although not significant, with proportion repaid in models 2 and 3 is likely to be a construct of the use of proceeds for scaling, as both costs and debt repayments are used in the calculation of proceeds.

[18] A further regression (not reported here) is run to ascertain whether on-going trading costs are greater in instances associated with going concern asset realisations than where the receiver is operating the business on a minimal basis with a view perhaps to only completing outstanding contracts. However, the sole variable associated with receivership trading costs (scaled by the total amount of secured debt due and then logged)) is the proportion of secured debt repaid. It would seem, therefore, that these trading costs do not detract from the amounts available to repay secured creditors but, to the contrary, are associated with realising greater value from the receivership so that proportionally higher repayments can be made to these creditors.

Table 10
Variables associated with total receivership costs

This table uses OLS regression to examine the variables associated with total receivership costs (defined as receivers' fees plus other direct receivership costs). Dependent variable in both models is natural log of total receivership costs. SALEMODE = 1 if going concern or mixed sale; = 0 otherwise. LOGSIZE = natural log of value of MBO at date it was established or, if this not available, of balance sheet value of total assets minus current liabilities. MULTCRS = 1 if more than one secured creditor; = 0 otherwise. RECTYPE = 1 if receiver not a Big Six firm; = 0 otherwise. LOGRECDAYS = natural log of length of receivership in days. ECON = 1 if receiver appointed in 1994 or later; = 0 if appointed in 1993 or earlier. PROPPAID = proportion of secured debt repaid by receivership. ALLPAID = 1 if 100% of secured debt repaid; = 0 otherwise. Figures in parentheses are p values.

Variable	Predicted sign	Model 1	Model 2
Number of cases		56	56
Intercept	?	−2.896	−1.374
		(.126)	(.509)
SALEMODE	+	0.438	0.569
		(.105)	(.062)
LOGSIZE	+	0.242	0.246
		(.002)	(.004)
MULTCRS	?	0.089	−0.011
		(.735)	(.971)
RECTYP	+	0.202	0.065
		(.413)	(.813)
LOGRECDAYS	+	0.601	0.500
		(.023)	(.088)
ECON	−	0.726	0.667
		(.022)	(.063)
PROPPAID	+	1.599	
		(.000)	
ALLPAID	+		0.655
			(.069)
Adjusted R^2		0.400	0.241
F		6.249	3.493
F (sig)		0.000	0.004

Note: The highest correlation among the independent variables is −0.299 between LOGRECDAYS and ECON.

has proved difficult, so that by the time the assets are actually sold piecemeal a substantial amount of time has passed. Finally, Table 12 also shows a weak relationship between length of the receivership and the presence of a single secured creditor.

7. Conclusions

In this paper we have used a unique, hand-collected dataset of 65 MBOs in distress, producing a final sample of 57 firms, to analyse the efficiency of the bankruptcy process and in particular, the determinants of bankruptcy costs. The first dimension of bankruptcy costs studied is the level of secured creditor recovery rates. In particular, exploiting the fact that MBOs often have more than

one secured lender, we investigate whether the presence of multiple secured creditors has a negative impact on recovery rates. Our findings do not support the argument that multiple lenders create inefficiencies resulting in significantly lower secured creditor recovery rates. However, when there are multiple secured lenders there is strong evidence that, thanks to its strong priority achieved via a variety of mechanisms, the senior secured lender gains at the expense of other secured creditors.

Secondly we examine direct receivership costs. Our results support the view that these costs consume a significant percentage of the receivership proceeds, with both mean and median receivership

Table 11
Variables associated with scaled receivership costs

This table uses OLS regression to examine the variables associated with scaled receivership costs. Dependent variable in model 1 is the natural log of receivership costs scaled by total secured debt due; in model 2 receivership costs scaled by gross receivership proceeds (defined as repayments to secured creditors plus receivership costs plus ongoing trading costs during the receivership); in model 3 the natural log of receivership costs scaled by net receivership proceeds (defined as repayments to secured creditors plus receivership costs). SALEMODE = 1 if going concern or mixed sale; = 0 otherwise. LOGSIZE = natural log of value of MBO at date it was established or, if this not available, of balance sheet value of total assets minus current liabilities. MULTCRS = 1 if more than one secured creditor; = 0 otherwise. RECTYPE = 1 if receiver not a Big Six firm; = 0 otherwise. LOGRECDAYS = the natural log of length of receivership in days. ECON = 1 if receiver appointed in 1994 or later; = 0 if appointed in 1993 or earlier. PROPPAID = proportion of secured debt repaid by receivership. Figures in parentheses are p values.

Variable	Predicted sign	Model 1	Model 2	Model 3
Number of cases		55	56	55
Intercept	?	0.272	0.742	−0.372
		(.888)	(.001)	(.603)
SALEMODE	+	0.066	0.012	0.130
		(.808)	(.686)	(.394)
LOGSIZE	−	−0.136	−0.017	−0.094
		(.072)	(.052)	(.026)
MULTCRS	?	−0.180	−0.062	−0.379
		(.506)	(.044)	(.012)
RECTYP	+	−0.023	−0.006	0.054
		(.928)	(.840)	(.702)
LOGRECDAYS	+	−0.305	−0.051	−0.038
		(.250)	(.088)	(.682)
ECON	−	−0.171	−0.023	0.136
		(.599)	(.510)	(.425)
PROPPAID	+	1.899	−0.074	−0.191
		(.000)	(.102)	(.391)
Adjusted R²		0.377	0.111	0.144
F		5.659	1.981	2.299
F (sig)		0.000	0.077	0.042

costs equal to about 20% of total receivership proceeds for our sample of 57 firms with cost data, while continuing trading costs consume a further 29% of total receivership proceeds. We find that direct receivership costs, both absolute and scaled by the amount of debt due, are positively related to the proportion of secured debt repaid, lending support to the efficiency argument that secured creditor recoveries do not suffer at the expense of high receivership costs. This finding is consistent with the expectation that our sample of MBO firms, being highly leveraged, are unlikely to be over-secured, resulting in the lenders having relatively strong incentives to control bankruptcy costs. In addition, consistent with the scale hypothesis, we find that the relative level of receivers' fees declines as firm size grows.

The final dimension of receivership costs investigated is receivership length. We find that the average length is 3.0 years and is substantially longer in a significant minority of cases. However, 95% of secured creditor repayments are made on average within the substantially shorter period of 1.9 years, thus mitigating potential indirect costs brought about by excessively long receiverships. Finally, we find that receiverships last longer, the larger the amount of debt owed to the secured lenders, and when the receivership commences during economic recession, apparently due to the length of time needed to make piecemeal realisations when the economy is weak.

Our findings complement and extend the debate concerning the nature of the bankruptcy regime in court-based versus contract-driven sys-

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Table 12
Variables associated with length of receivership

This table uses OLS regression to analyse the variables associated with length of receivership. Dependent variable is defined as the natural log of total length of receivership in days. SALEMODE = 1 if going concern or mixed sale; = 0 otherwise. MULTCRS = 1 if more than one secured creditor; = 0 otherwise. PROPPAID = proportion of secured debt repaid by receivership. LOGDUE is the natural log of total secured debt repayable. ECON = 1 if receiver appointed in 1994 or later; = 0 if appointed in 1993 or earlier. Figures in parentheses are p values.

Variable	Predicted sign	
Number of cases		64
Intercept	?	6.011
		(.000)
SALEMODE	?	–0.133
		(.281)
MULTCRS	?	–0.229
		(.070)
PROPPAID	–	0.117
		(.520)
LOGDUE	+	0.202
		(.000)
ECON	–	–0.442
		(.001)
Adjusted R^2		0.308
F		6.596
F (sig)		0.000

Note: The highest correlation among the independent variables is –0.364 between PROPPAID and LOGDUE.

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tems (see, for example, Franks et al., 1996, and Davydenko and Franks, 2005). Jensen (1989) has argued for the efficacy of the latter over the former, citing leveraged and MBOs as examples of such transactions. He argues that high leverage promotes closer monitoring of management and hence is likely to result in a speedier and more efficient response when problems occur. US evidence relating to the court-based Chapter 11 process, suggests that the direct costs of bankruptcy are lower where the firm is a highly leveraged transaction (Betker, 1997). There is evidence that banks lending to MBOs typically establish specialist departments to monitor these transactions which are recognised as requiring different skills in structuring and monitoring compared to other forms of corporate lending (Citron et al., 1997). However, high levels of leverage also increase financial risk and banks are less likely to be as over-secured as in private lending generally. This study has investigated those MBOs which, despite the presence of specialised lender monitoring, nevertheless entered formal insolvency procedures. These cases, therefore, will have been the ones considered most difficult to reorganise. This is consistent

with our findings that, in comparison with Franks and Sussman's (2005) more general population of small firms, these MBOs experienced fewer going-concern realisations in receivership, made a lower average repayment to secured creditors and made fewer 100% repayments to these creditors. These results also contrast with our expectations about buy-outs following Jensen (1989).

Our evidence relating to the influence of multiple creditors is particularly interesting. The finding that when there are multiple secured lenders, the senior secured lender gains at the expense of other secured creditors extends previous research that secured lenders gain at the expense of unsecured lenders. The finding that the presence of multiple secured creditors is associated with lower scaled receivership costs lends support to the view that multiple creditors either have a stronger incentive or more ability to exercise control over receivers' fees than does a single creditor. We cannot exclude the possibility that since banks lending to MBOs tend to engage in repeat syndication with other MBO lenders, the desire to maintain reputation is an important influence on the behaviour of the parties concerned.

Our study suggests areas for further research.

Given the time-period to failure, we started with the population of MBOs in the UK completed in the period 1990–1995 that subsequently went into financial distress. As noted, earlier, given the pattern of failures of these MBOs, our sample companies generally involve smaller MBOs. Future research might usefully extend this analysis to more recent periods. This would enable further research questions to be explored that were not feasible here. First, the surge in public to private and secondary MBOs largely occurred after the end of our period. An interesting issue concerns whether these transactions, with arguably higher levels of information availability at the time of the deal than traditional private MBOs, involve different recovery rates and bankruptcy costs amongst those that subsequently fail. Numbers of failures, however, remain low making quantitative analysis difficult.

For example, despite the surge in public to private buy-outs since the late 1990s, over the period 1986–2006, only 26 public to private buy-outs failed (6.3% of the total) (CMBOR, 2007). Second, since 2000 in particular, larger deals have been completed with substantially higher percentages of leverage (Wright et al., 2007). These increases have prompted regulatory concerns about the likelihood of collapse of large private equity deals and the impact on lenders, purchasers of the debt and orderly markets (Financial Services Authority, 2006). An interesting question concerns whether the recovery rates in subsequent failures from among these transactions differ from smaller and mid-sized transactions. Detailed analysis of this question, however, may need to await recessionary conditions given the very low failure rate of these deals so far (Figure 1).

Appendix
Illustrative examples of receivers' on-going trading costs

Analysis of on-going trading costs (£000s)	A	B	C	D
Retention of title	27.0	78.1	0	35.0
Bank charges	2.3	30.9	0.9	7.5
Salaries and wages	0	758.9	264.7	118.8
Other (trading, etc.) – see below	1,481.5	12,673.3	2,593.8	1,185.6
Total	1,510.8	13,541.2	2,859.4	1,346.9
Other (trading, etc) includes:				
Trading costs	1,176.1			
Ingredients, packaging & beer duty		10,625.4		
Vehicles			1,882.2	
Trading purchases				1,032.3

Note: For reasons of confidentiality, the real names of the companies have been replaced by letters.

References

Andrade, G. and Kaplan, S. (1998). 'How costly is financial (not economic distress)? Evidence from highly leveraged transactions that became distressed'. *Journal of Finance*, 53: 1443–1494.

Ang, J., Chua, J. and McConnell, J. (1982). 'The administrative costs of corporate bankruptcy: A note'. *Journal of Finance*, 37: 219–226.

Armour, J. and Frisby, S. (2001). 'Rethinking receivership'. *Oxford Journal of Legal Studies*, 21: 73–102.

Betker, B. (1997). 'The administrative costs of debt restructurings: Some evidence'. *Financial Management*, 26: 56–68.

Black, B. and Gilson, S. (1998). 'Venture capital and the structure of capital markets: banks versus stock markets'. *Journal of Financial Economics*, 47: 243–277.

Bolton, P. and Scharfstein, D. (1996). 'Optimal debt structure and the number of creditors'. *Journal of Political Economy*, 104: 1–25.

Bris A., Welch, I. and Zhu, N. (2004). 'The costs of bankruptcy: Chapter 7 cash auctions vs. Chapter 11 bargaining'. Yale ICF Working Paper No. 04–14.

Chemmanur, T. and Fulghieri, P. (1994). 'Reputation, renegotiation and the choice between bank loans and publicly traded debt'. *Review of Economic Studies*, 7: 475–506.

Chew, D., Jackson, T., Juroe, P., Smith, C. and Tabas, J. (2004). 'Preserving value in Chapter 11: A roundtable discussion of the bankruptcy process'. *Journal of Applied Corporate Finance*.

Citron, D., Robbie, K. and Wright, M. (1997). 'Loan covenants and relationship banking in MBOs'. *Accounting and Business Research*, 27 (4): 277–294.

CMBOR (2007). 'Public to Private Buy-outs', *Management Buy-outs – Quarterly Review from CMBOR*, Centre for Management Buy-out Research, Winter 2006/7.

Davydenko, S.A. and Franks, J.R. (2005). 'Do bankruptcy codes matter? A study of defaults in France, Germany and the UK'. Working paper, London Business School.

Dennis, S. and Mullineaux, D. (2000). 'Syndicated loans'. *Journal of Financial Intermediation*, 9: 404–426.

Diamond, D.W. (1984). 'Financial intermediation and delegated monitoring'. *Review of Economic Studies*, 51, 393–414.

Farrar, J.H. and Hanningan B.M. (1998). *Farrar's Company Law*. London: Butterworths (4th edition).

Ferris, S. P. and Lawless, R. M. (2000). 'The expenses of financial distress: The direct costs of Chapter 11'. *University of Pittsburgh Law Review*, 61: 629–655.

FSA. (2006). Private Equity: A Discussion of Risk and Regulatory Engagement, Financial Services Authority Discussion Paper 06/6.

Fisher, T. C. G. and Martel, J. (2001). 'On direct bankruptcy costs and the firm's bankruptcy decision'. Working paper. Department of Economics, Wilfrid Laurier University, Waterloo ON, Canada.

Franks, J. R. and Torous, W. (1994). 'A comparison of financial recontracting in distressed exchanges and Chapter 11 reorganizations'. *Journal of Financial Economics*, 35: 349–370.

Franks, J. R., Nyborg, K. and Torous, W. (1996). 'A comparison of US, UK and German insolvency codes', *Financial Management*, 25: 86–101.

Franks, J. R. and Sussman, O. (2005). 'Financial distress and bank restructuring of small-to-medium size UK companies'. *Review of Finance*, 9: 65–96.

Gilson, S., John, K. and Lang, L. (1990). 'Troubled debt restructurings: An empirical analysis of private reorganization of firms in default'. *Journal of Financial Economics*, 26: 315–353.

Gilson, S. (1997). 'Transaction costs and capital structure choice: Evidence from financially distressed firms'. *Journal of Finance*, 52: 161–196.

Guffey, D.M. and Moore, W.T. (1991). 'Direct bankruptcy costs: Evidence from the trucking industry'. *The Financial Review*, 26 (May): 223–235.

Jensen, M. (1989). 'Active investors, LBOs and the privatization of bankruptcy'. *Journal of Applied Corporate Finance*, 2: 35–44.

Jensen, M. C. (1986). 'Agency costs of free cash flow, corporate finance and takeovers'. *American Economic Review*, 76: 323–329.

Kaplan, S. N. and Stein, J. (1993). 'The evolution of buyout pricing in the 1980s'. *Quarterly Journal of Economics*, 108: 313–357.

Lee, S. W. and Mullineaux, D.J. (2004). 'Monitoring, financial distress and the structure of commercial lending syndicates'. *Financial Management*, 33(3): 107–130.

Lightman, (1996). 'The challenges ahead: Address to the Insolvency Lawyers' Association'. *The Journal of Business Law*, March, 113–126.

LoPucki, L. (1983). 'The debtor in full control – system failures under Chapter 11 of the bankruptcy code'. *American Bankruptcy Law Journal*, 57: 99–126 and 247–273.

Lubben, S. J. (2000). 'The direct costs of corporate reorganization: An empirical examination of professional fees in large Chapter 11 cases'. *American Bankruptcy Law Journal*, 74: 509–552.

Manove, M., Padilla A.J. and Pagano, M. (2001). 'Collateral versus project screening: A model of lazy banks'. *Rand Journal of Economics*, 32/4: 726–744.

Moir, L. and Sudarsanam, S. (2007). 'Determinants of financial covenants and pricing of debt in private contracts: the UK evidence'. *Accounting and Business Research*, 37/2: 151–166.

Mokal, R.J., (2003). 'The Floating Charge – An Elegy', Ch.17 in Worthington, S. (ed.), *Commercial Law and Commercial Practice*, Oxford: Hart.

Mokal, R. J. (2004). 'Administrative receivership and administration: An analysis'. *Current Legal Problems*, 57.

Pulvino, T. (1998). 'Do asset fire sales exist? An empirical investigation of commercial aircraft transactions'. *Journal of Finance*, 53: 939–978.

Shleifer, A. and Vishny R.W. (1992). 'Liquidation values and debt capacity: A market equilibrium approach'. *The Journal of Finance*, 47: 1343–1366.

Smith, C. and Warner, J.B. (1979). 'On financial contracting: An analysis of bond Covenants'. *Journal of Financial Economics*, 7: 117–161.

Smith, C. W. (1993). 'A perspective on accounting-based debt covenant violations'. *Accounting Review*, 68(2): 289–303.

Sterling, M. and Wright, M. (1990)., *Management Buyouts and the Law*, Oxford: Blackwell Scientific.

Stromberg, P. (2000). 'Conflicts of interest and market illiquidity in bankruptcy auctions: Theory and tests'. *Journal of Finance*, 55: 2641–2691.

Tashjian, E., Lease, R. and McConnell, J. (1996). 'Prepacks: An empirical analysis of prepackaged bankruptcies'. *Journal of Financial Economics*, 40: 135–162.

Thorburn, K. (2000). 'Bankruptcy auctions: Costs, debt recovery and firm survival'. *Journal of Financial Economics*, 58: 337–368.

Warner, J.B. (1977). 'Bankruptcy costs: Some evidence'. *Journal of Finance*, 337–347.

Weiss, L.A. (1990) 'Bankruptcy resolution: Direct costs and violation of priority of claims', *Journal of Financial Economics*, 27 (2): 285–314.

Wright, M., Chiplin, B., Thompson, S. and Robbie, K. (1991). *Buy-ins and Buy-outs: New Strategies in Corporate Management*. London: Graham & Trotman.

Wright, M., Burrows, A., Ball, R., Scholes, L., Meuleman, M. and Amess, K. (2007). *The implications of Alternative Investment Vehicles for Corporate Governance: A Survey of Empirical Research*, Report prepared for the Steering Group on Corporate Governance. Paris: OECD.

Wruck, K. (1990). 'Financial distress, reorganization and organizational efficiency'. *Journal of Financial Economics*, 27: 419–444.

Book Reviews

Organized Uncertainty: Designing a World of Risk Management. *Michael Power.* Oxford University Press, 2007. xviii and 248pp. ISBN 978-0-9-925394-4. £24.99.

As Power notes in the preface, 'another book on risk is a risky venture for any author'. This book stands apart from others, as it is Power's follow-up to his seminal work on *The Audit Society* (1997). In this instance, Power considers the emergent construction of audit through representations of the 'new reflexivity of organizations and organizing around risk management' (p. 4) and the 'objectivication' (p. 18) of new risk boundaries and management processes. This involves Power's identification of patterns in risk management practice as designs in the face of uncertainty and highlighting the need to recognise the caveats on which such constructions are grounded. I have little doubt this book will become a seminal reference for those engaged in the risk debate.

As Power recognises in the introduction, the book has been developed by piecing together a recent collection of his work. As such, the chapters appear as a collection of essays drawing together his work on themes such as 'The Invention of Operational Risk' (2005) and 'The Risk Management of Everything' (2004) and draws heavily on Power's research and advisory work with financial institutions and regulators. This design has the advantage of attracting potential readers on selected issues such as internal control, measurement, standardising risk management or governing reputation in addition to those committed to reviewing Power's broad treatise on the risk debate and auditability. With this in mind, Power's detailed introduction and chapter-by-chapter guidance directs the reader from the start to finish while carefully signposting attention to other work, both his own and that of others. His thoughtful conclusions on the construction of risk 'objects' and risk 'management processes' help to conceptually ground his extensive insights on practice and reflect on their implications for the 'moral' economy of risk management and contribution to an audience concerned with risk, auditability, and governmentality.

An interesting practice recognised by Power, is the current tendency for corporate managers to view engagement on corporate social responsibility (CSR) as an opportunity to improve shareholder value rather than a risk to reputation. This opportunity is created by a shift from a focus of risk analysis to risk governance that involves 'the "turning inside out" of organizations' (p. 29). Critiquing this practice, Power recognises CSR is founded on a premise that the so called 'moral economy' holds management accountable for the processes they design rather than any ethical sense of social or environmental accountability. Reading through Power's reference to requirements for risk disclosure, such as those contained within Basel 2 regarding regulation of risk by financial institutions, I wonder if this linguistic turn from risk to opportunity may also be an attempt to avoid risk disclosure.

The need for management to make decisions in the face of uncertainty is far from a new idea in the disciplines of accounting and finance. The particular contribution of this book is Power's reflection on governance that extends beyond the corporate boundary to the creation of a 'systems-theoretic' abstraction of auditable risk management processes within society. This places audit risk in the face of uncertainty within a broader debate on new public risk management that allows us to question the 'logics of democracy and managerial processes' (p. 19). In my mind, the book's greatest contributions are to synthesise Power's position on risk as a starting point from which to move beyond a risk agenda; and to question, for example, the congruence between claims of corporate and social/environmental governance by reflecting on the methodological assumptions underpinning risk management.

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Intellectual Capital Reporting: Lessons from Hong Kong and Australia. *J. Guthrie, R. Petty and F. Ricceri.* The Institute of Chartered Accountants of Scotland, 2007, vii and 118pp. ISBN 978-1-904574-27-9. £15

This monograph is a further contribution to the contemporary intangibles field published by the Institute as one element of its continuing interest in promoting debate about the future of business reporting. Its authors have been active in this field for a number of years, with Guthrie in particular having actively promoted intellectual capital research through both his own publications and via

the *Accounting, Auditing and Accountability Journal* of which he is co-editor. As the title indicates, the authors provide empirical insights drawn from Hong Kong and Australia, where organisations engage in relatively high levels of intellectual capital disclosure.

Chapter one identifies a number of themes and developments that have informed the research reported in the monograph. The goal of the study is identified as being 'to further the understanding of when, and how, organisations voluntarily report their intellectual capital.' (p. 11). This informs the objective of 'apply[ing] some rigour to the investigation of the voluntary disclosure of intellectual capital by organisations in their annual reports' to provide much needed empirical evidence, which in turn gives rise to five interrelated aims of the study. The chapter concludes with a brief outline of the monograph's structure.

The second chapter provides an excellent overview of the development of intellectual capital reporting, and is of value to both general readers and specialists alike. Regulated reporting in Austria and Denmark is initially outlined, reinforcing the credibility of the Intellectual Capital Statement approach developed in the latter country during the past decade. The authors continue by discussing voluntary reporting practices as they have evolved in Australia, Japan and in other parts of Europe. The absence of any reference to the UK situation is addressed in a section that links intellectual capital reporting with recent debates about the utility of a Management Commentary approach, where there is a brief discussion of the abandoned initiative to introduce an enhanced Operating and Financial Review requirement and its replacement by a Business Review.

Entitled 'A brief literature review', the following chapter covers some of the same ground, albeit by making reference to scholarly contributions rather than professional guidelines, frameworks and regulations. Incorporated in this chapter is a discussion of three theoretical perspectives as they relate to voluntary and statutory reporting: legitimacy theory; stakeholder theory; and institutional theory. The limitations of a simple valuation perspective on intellectual capital are briefly identified and compared to alternative ideas on how to capture (and report) intellectual capital growth, together with some thinking on the better classification of intellectual capital itself.

The case for the authors' chosen research approach, a content analysis of annual reports, takes up three pages of Chapter four on the research design of the study, which also briefly documents the two countries investigated and the range of intellectual capital reporting media. The results of the analysis itself are reported in Chapter five. These need to be read in conjunction with Appendix A,

which provides some definitional details of the principal components of the intellectual capital concept, together with examples of these as encountered within the sample of annual reports analysed. The principal findings are that Australian organisations disclose more information on intellectual capital than Hong Kong organisations, although the latter discloses more information on human capital. The greatest part of these disclosures is narrative in form, a practice that the authors believe makes performance assessment more problematic. Larger organisations disclose more information than smaller organisations; since this disclosure is entirely voluntary in both countries, large organisations will continue to play a vanguard role in intellectual capital reporting.

The monograph concludes with a brief résumé of the principal findings of the study, followed by an affirmation that it is desirable for there to be some movement towards international standardisation of intellectual capital reporting, preferably by means of mandatory requirements. It is envisaged that organisations will continue to engage in voluntary disclosure practices, since these often serve their own interests. More research is necessary on why to report, what to report and how (best) to report it, providing information that should inform any future regulatory developments. A 15-page list of references is included at the end of the monograph, which is prefaced by an Executive Summary.

While welcoming this contribution to the literature, for me the monograph raises a number of important issues. Initially I am disappointed by the very limited amount of new empirical information reported here. A total of 150 organisations' annual reports were analysed, of which only two (Australian) failed to report anything about 18 elements of intellectual capital. The table on p. 63 indicates that a total of 2,900 items of intellectual capital were reported by these 148 organisations, yet this only translates into 15 pages of findings, excluding those included in Appendix A. One possible explanation is that the actual references to intellectual capital uncovered were so sparse that it was difficult to construct a longer story. This links to a second concern I have about the study, namely the use of content analysis. I do not seek to dissuade researchers from using content analysis, nor deny that it has been used to some effect by earlier researchers in this and the related field of social and environmental accounting and reporting. In my own view, however, using content analysis where there is a low likelihood of relevant content being reported is inevitably going to result in limited findings. Consequently, I would encourage researchers interested in embracing social scientific research designs to consider field studies, and carrying out interviews with participants in leading

edge organisations. This in turn leads to a third concern, that of only scrutinising intellectual capital reporting within annual reports and similar statutory accounts. Given the context of largely voluntary external reporting, it seems reasonable that more insights might be gained from analysing internal reporting documents and interviewing those who are responsible for their production. Finally, and in my own view most significantly, it is interesting to note that both Australia and Hong Kong would appear to be some way ahead of the UK in both reporting on intellectual capital and, based on the list of references presented here, researching this field.

For those already interested in intellectual capital and intangibles, this monograph is a very worthy addition to the literature. Whether it helps promote the increased research effort needed to inform policy change is quite a different matter.

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The Routledge Companion to Fair Value and Financial Reporting. *P. Walton* (ed.). Routledge, 2007. xviii and 404 pp. ISBN 978-0-415-42356-4. £95.

This was intended as a conventional review of an edited collection of essays on a single topic, namely fair value accounting. However it has emerged as a comment not only on fair value but also on financial reporting more generally, in the context of fair value. The editor is a respected international accounting academic and journalist. The topics of fair value (FV) and fair value accounting (FVA) arguably are significant issues affecting contemporary financial accounting standards. The editor rightly observes the paucity of literature on FV and FVA – despite their considerable presence in reporting practice. The 26 contributors are well-known in their communities. There are 12 academics, six accounting standard-setters, and eight practitioners from public accountancy, investment, and finance. Most of the contributors have relevant experience in more than one of these areas and they come from four geographical regions. There are 10 from the UK, nine from Continental Europe, four from the Pacific Rim, and three from North America. The topic is examined from different perspectives (e.g. theoretical, practical, historical, and empirical) and there are inevitable differences in style and depth of analysis.

The text is described as a work of reference and a handbook. For this reason, the review process should be relatively straightforward. Read each chapter, take notes, describe and comment briefly on each chapter, and end with an overview containing a recommendation regarding use and purchase. However, despite its defined focus on FV and FVA, the text has been challenging to review. This is not because of what the contributors say about FV and FVA. Much of the text material is constructive, sensible, relevant, and readable. As in similar studies, some chapters are outstanding and others will have shorter shelf lives. The problem for this reviewer has been what the contributors inadvertently or explicitly say about the wider topic of the current state of corporate financial reporting theory and practice. In other words, the text is not just about FV and FVA. It is also about corporate financial reporting. For this reason, the text deserves a more critical review than normal.

Before proceeding to the review, some general comments are appropriate. There is a strong recommendation that the text ought to be in every university and technical library. I would strongly encourage library acquisition and hope that recommendations for purchase will not be constrained by the price. It is understandable that publishers need to be profitable and that short print runs inevitably mean daunting prices in a world accustomed to deep discounts by supermarkets and online bookshops. However, there is also a positive correlation between longer print runs, higher sales, and lower prices. The text should be of considerable use to anyone concerned to learn about the nature, role, practices, and problems of FV and FVA at the beginning of the 21st century. The editor and publisher are to be congratulated for their efforts in bringing FV and FVA into the more general financial reporting literature. Nevertheless, there are certain drawbacks to the text:

- Potential readers are warned about the degree of repetition of subject matter. It is extensive and has been acknowledged by the editor – raising the question of why it has remained so high and explicit.

- There is a distinct European bias in the contributions as nearly three-quarters are from the European Union. Given the prominence of FV and FVA in North America, a more balanced presentation would have been ideal – but perhaps there are few American academics (particularly) who are interested in the topic beyond its modelled impact on such matters as information asymmetry, agency costs, and bankruptcy prediction.

- The reader gets a clear impression that, in some of the (mainly academic) contributions the topic brief has been manipulated to present their views on an aspect of the current state of financial reporting theory and practice they feel passionate about.

What follows is a discussion of what the contributions reveal about the current state of FV and

FVA specifically and corporate financial reporting more generally.

Need for financial accounting theory

The text contributions clearly reflect the confused and confusing state of corporate financial reporting today. Recent practice developments such as FV and FVA have taken place virtually in the absence of a coherent theoretical structure to justify their use in reports. Since the abandonment of normative and prescriptive accounting thought in the academic accounting literature by the early 1980s due to the advocacy for a more scientific approach by American researchers such as Watts and Zimmerman,[1] accounting standard-setters such as the FASB and the IASB do not appear to have been unduly aware of, influenced by, or interested in the large body of theoretical literature that had accumulated in the 1960s and 1970s on matters such as current valuation. For this reason, it is interesting to observe how the contributors to this text approached FV and FVA from a theoretical stance. Obviously, there are some contributions that by their very nature do not demand theoretical perspectives. Ten are specifically categorised as dealing with practice issues. However, of the remainder, five refer to the nature and role of FV and FVA and 11 are categorised explicitly by the editor as theoretical.

Judged by the normative and prescriptive standards of the best of accounting theory in the 1960s and 1970s, most of the theoretical chapters pay lip service to theory. With a few exceptions, they prefer to look at FV and FVA through the vague conceptual framework lens of reporting characteristics such as relevance and reliability. These characteristics are typically poorly defined and there is little detailed discussion of decision user needs and FV and FVA. Nor are FV and FVA adequately discussed in terms of reliably representing socially-constructed realities.[2] More germane to current practice globally, the theoretical contributions make no mention at all of the association between FV and FVA and reporting quality labels such as true and fair view and fair presentation.[3]

Inevitably in these circumstances, the theoretical discussion is limited and lacking in depth. For example, FV is typically discussed by means of a favourite approach of accounting standard-setters – i.e. by considering definitions, rules, exclusions, and problems. More specifically, the case for FV is made with reference to attributes defined by definitions and principles enunciated in conceptual frameworks. The case against FV is made because it appears feasible only in ideal economic markets or because it has no apparent theoretical background, and is therefore inferior to alternative approaches such as mixed values using deprival value or a combination of book value and the present value of super profits. Alternatively, FV is ar-

gued as a surrogate for current economic value or as a means of closing the numerical gap between book value and market value. Individual entity circumstances are claimed to justify the use of mixed values rather than FV despite the additivity problem, and various empirical studies are used to suggest FV reduces informational asymmetry, takeovers, investment returns, political costs, and accounting manipulation while increasing audit difficulty. Only in two contributions are there attempts to get back to fundamental theoretical notions such as measurement and what FV is attempting to measure.

A curious aspect of the text, given the interpretation of FV by the FASB and IASB in terms of exit values, is that with one exception there is no detailed mention of exit value theories of financial accounting advocated by writers such as Chambers[4] and Sterling,[5] nor of the unified system of financial reporting using exit values proposed and tested by The Institute of Chartered Accountants of Scotland.[6] Instead, the theoretical contributions that can be truly labelled as such prefer to examine FV and FVA in the context of entry values modified by other current values, and use normative advocates of these systems such as Edwards and Bell[7] and Baxter.[8] Perhaps this is because accountants have become used to observing financial reporting as a predominantly entry value system (i.e. using historical costs modified by current values). Alternatively, it may be the result of a profound dislike of the idea of a complete system of exit values – i.e. that there is preference for an incoherent mixed value system over a coherent exit value one.

Whatever the explanation for the theoretical approach of its contributors, this text reflects two disturbing features about theoretical thinking associated with corporate financial reports – first, there is a widespread inability to examine a practical issue such as FV and FVA with associated theories (as distinct from conceptual frameworks) and, second, an unwillingness by the more sophisticated theoretical commentators to consider from a theoretical perspective the extension of a limited use of exit values (as in FV) to a unified system of exit value accounting. If financial accounting practice is incomplete and incoherent, then so too is financial accounting theory.

Current state of financial reporting practice

The practical issues surrounding FV and FVA are discussed by the contributors in the context of a corporate financial reporting system based in practice on a mixture of values (i.e. historical costs, present values, and current market prices) and determined by a combination of objective observation and subjective forecast and estimate. FV and FVA in current practice give the perception that they are recent and more objective additions to this

mix and appear to have a considerable presence in practice. However, in reality, and as some of the text contributors recognise, FV and FVA have a relatively limited role at present (i.e. predominantly with the exit valuation of financial assets and liabilities) and have existed in exit value form for many years in conventional practice (e.g. when allocating acquisition costs or acting as a floor in the lower of cost or market rule). FV and FVA are therefore not novel and do nothing to diminish the clarity of the current chaotic, incoherent, and incomplete state of corporate financial reporting practice.

What are less clear from the contributions of this text are the historical origins of FV (and therefore FVA). They appear to have arisen in a US Supreme Court case in 1898 of *Smyth v Ames*.[9] The case is mentioned in the text but the case specifics are not. The case concerned the setting of rates or prices by publicly regulated utilities such as railroad companies. In this case, because of falling replacement costs, the railroad company claimed it was unfair to use replacement costs as the basis to set prices and that historical costs should be used instead. The Interstate Commerce Commission (ICC) and the Supreme Court disagreed and replacement cost or entry value was used as a fair valuation for rating purposes. A burgeoning literature appeared in the economic and engineering communities.[10] Interestingly, the ICC later switched its preference to historical costs as fair value when determining utility rates. Also of interest in the current text under review is that certain contributors interpreted FV in terms of entry values and were therefore consistent with the historical, economic, and legal roots of the concept at the end of the 19th century and early decades of the 20th century.

The practical contributions to this text highlight other issues of practice. For example, FV and FVA appear to accentuate rather than diminish the additivity issue in financial reporting (i.e. the inability of accountants to derive meaningful report totals associated with income, assets, liabilities, and capital from a mixture of disparate values). Some of the contributors evoke old arguments to justify the use of different values as surrogates for a common value (e.g. as in deprival value theory[11] and current cost accounting practice in the 1970s and 1980s).[12] However, claiming that six apples, four pears, and two oranges are 12 fruits does not necessarily provide a relevant and reliable total.

Further, as several of the contributors reveal, FV and FVA add to conventional accounting subjectivity because they involve a hierarchy of value precision – ranging from observable and independent market prices in extensive and well-regulated markets for assets intended for sale, to subjective forecasts and guesses in situations involving no markets and no desire to sell assets.

The issues in this respect are not only for preparers and users but also for auditors. The audit dimension of FV and FVA is explored in one chapter of the text primarily from the perspective of audit approach and procedures associated with risk and uncertainty assessment and materiality. The association of FV and FVA to the auditor's opinion on the truth and fairness or fair presentation of reported information is not mentioned in this text.

The text contributions do contain commentary on the notion that FV and FVA affect different companies and industries in different ways. For example, the financial reports of banks and insurance companies involve predominantly financial assets and liabilities and appear more amenable to FV and FVA. To the contrary, manufacturing concerns with asset structures of plant, equipment, and inventories are much less affected. Several contributions also signal one of the most vexed problems in current financial reporting practice – i.e. assets omitted from reported financial statements (particularly internally generated intangibles). Companies have market values and individual company assets have market values. It is possible to add the latter and subtract the total from the former and claim the difference as the market value of goodwill. However, this is over-simplistic and ignores the issue of the interaction of assets within corporate business operations. Thus, in a perverse way, FV and FVA appear to make this issue more rather than less intractable because of the obvious difficulties not only of recognising intangible assets but of representing them with reliable accounting numbers. Finding a FV for an asset that has been internally created rather than acquired seems to be a problem ignored by most of these contributors. Their discussions imply that FV and FVA can be credibly discussed within the context of acquired assets only. This would suggest an inadequate understanding in practice of the need to properly define periodic income and related capital. In other words, much of the practical discussion about FV and FVA in this text concerns the representation of assets (and liabilities). It has little to say about their recognition.[13] Issues such as the representational faithfulness of FV cannot be meaningfully discussed unless there is a prior discussion of what is to be recognised for purposes of representation by FVA.

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[1] R Watts & J Zimmerman, *Positive Accounting Theory* (Prentice Hall, Englewood Cliffs: NJ, 1986).

[2] See T A Lee, 'The FASB and Accounting for Economic Reality," *Accounting in the Public Interest*, 6, 2006, 1–21.

[3] See D Alexander & S Archer, 'On Economic Reality, Representational Faithfulness, and the "True and Fair Override"', *Accounting and Business Research*, 33 (1), 3–17.

[4] R J Chambers, *Accounting, Evaluation and Economic*

Behaviour (Prentice Hall, Englewood Cliffs: NJ, 1966).

[5] R R Sterling, *Theory of the Measurement of Enterprise Income* (University of Kansas Press, Kansas City: KA, 1970).

[6] P N McMonnies, *Making Corporate Reports Valuable* (Institute of Chartered Accountants of Scotland, Edinburgh, 1988).

[7] E O Edwards & P W Bell, *The Theory and Measurement of Business Income* (University of California Press, Berkeley: CA, 1961).

[8] W T Baxter, *The Case for Deprival Value* (Institute of Chartered Accountants of Scotland, Edinburgh, 2003).

[9] M Chatfield, 'Smyth v Ames', in M Chatfield & R Vangermeersch (eds), *The History of Accounting: an International Encyclopaedia* (Garland Publishing, New York: NY, 1996, 563)

[10] For example, C L King, 'What is Fair Value?' *Survey*, 11 December 1915, 305; Anonymous 'Utility Does Not Receive a Fair Valuation When Cost of Physical Property Alone is Considered,' *American Gas Engineering Journal*, 17 November 1917, 454–5; H H Hartman, *Fair Value: the Meaning of the Application of the term 'Fair Valuation' as Used by Utility Commissions*, Houghton Mifflin, Boston: MA, 1920; E A Saliers, 'Cost, Fair Value, and Depreciation Reserve', *American Economic Review*, June, 1920, 272–82.

[11] See Baxter (2003), *op cit*.

[12] For example, 'Current Cost Accounting', *Statement of Standard Accounting Practice 16*, Accounting Standards Committee, London, 1980.

[13] See R R Sterling, 'An Essay on Recognition', *R J Chambers Research Lecture*, University of Sydney, Sydney, 1985.

UK Reporting of Intellectual Capital. *Jeffrey Unerman, James Guthrie* and *Ludmila Striukova.* ICAEW Centre for Business Performance, 2007. 68 pp. ISBN 978 1 84152 507 5. £20.

This research, funded by ICAEW's Centre for Business Performance, reports the results of an empirical study of intellectual capital (IC) reporting. The importance of the knowledge economy and of IC is increasingly recognised. Value added by manufacturing businesses in the UK has decreased steeply since 1995, whereas distribution and services account for more than 50% of gross value added in that period. It is therefore important to effectively report for IC aspects of business performance. However, given their intangible nature, reporting these assets in a relevant and reliable way is challenging. This important study will assist businesses in getting to grips with the financial reporting issues involved.

A tripartite approach is adopted, distinguishing between internal (structural) capital, external (relational) capital and employee competencies (human capital). Chapter 2 contains a comprehensive and up-to-date review of the literature.

Two methods of analysis are applied in the study: content analysis and in-depth interviews. The study is based on a relatively small sample of 15 companies. However, this small sample generated an amazing 2,676 IC disclosures.

Sample companies are selected based on size and industry. Companies were selected from the FTSE 100, FTSE 250 and FTSE small cap mar-

kets. Four sectors were chosen: two with substantial IC – software/information technology and pharmaceuticals/biotechnology. Real estate/ultilities were selected as the third sector because they are likely to have substantial tangible assets and little IC. The fourth sector, retailing, was expected to have a 'medium' amount of IC.

Content analysis was based on 20 sub-categories of IC disclosures. The unit of analysis is IC disclosure (number of disclosures) rather than volume of disclosure (number of words, etc.). Following Steenkamp and Northcott (2007), it is not completely clear whether the unit of analysis is based on words, sentences, themes, etc. Also, the researchers do not distinguish between the recording units (disclosures to be counted) compared with the context units (in order to classify the recording unit).

The corporate reports chosen for analysis were broader than prior studies, being all reports and web pages on a company website other than consumer direct-sales web pages.

A careful, systematic and comprehensive approach to analysing the interview material is taken based on O'Dwyer (2004). The authors use a software package, NVivo, to electronically track and collate the interview material. Six themes were used to structure the analysis: IC in annual reports, diversity in disclosure vehicles, role of different media as communications vehicles, aptitude of analysts in interpreting IC disclosures, standardisation of IC disclosures, and drawbacks in disclosing IC. The interview results chapter contains over 70 quotes from the interview data.

Reflecting the likely audience – business people rather than academics – results are generally reported using pie charts and bar charts rather than tables of results as would be the case in a refereed journal article. Disclosures around customers and distribution channels were found to be most frequent. As one would expect, larger companies were found to disclose more. Somewhat surprisingly, the retail sector disclosed the most, while IC disclosures in the real estates/utilities sector were similar to those in the software/information technology sector. Web pages were found to contain the most IC disclosures, with annual reports coming a close second. The majority (80 per cent) of IC disclosures were qualitative. Most quantitative disclosures were non-monetary.

The interviews threw up some interesting findings. The importance of annual reports as vehicles for disclosing new information is in decline. Interviewees commented that analysts would react negatively were annual reports to contain much new information. (Does this finding raise issues around insider information?). Another downside of annual reports with interviewees is their lack of readability. One-to-one meetings with analysts are

considered the best way of communicating IC value drivers, with press releases also being highly regarded. If companies communicate with key investor groups primarily through face-to-face meetings, it would suggest that accounting researchers need to move away from content analysis based on narrative disclosures to research based on verbal communications by managers. The policy implications for the accounting profession and regulators arising from the shift in reporting from traditional annual reports are discussed.

The audience for IC website disclosures is not necessarily investors – customers and potential recruits are also relevant. Interviewees expressed doubts about the ability of analysts, about their lack of knowledge about the companies they follow, and their lack of understanding of the importance of IC drivers. Accounting research assumes institutional investors are 'sophisticated'. The findings in this research monograph imply that such a broad assumption may not be valid. Interviewees were of the view that IC disclosures should not be regulated, but some additional guidance on effective disclosure of such information would be welcome. Drawbacks in disclosing IC are identified, including the availability of the information to competitors, the risk that investors would misinterpret the information and the downside of overloading investors with too much information.

This is a solid, rigorous piece of research – a must-read for researchers in this field. Five areas for further research are suggested at the end of the report – a useful list for researchers coming to this field for the first time.

Apart from the quality of the research, the report is readable – clearly and professionally structured, with an attractive presentation style.

References

O'Dwyer, B. (2004). 'Qualitative data analysis: Illuminating a process for transforming a 'messy' but 'attractive' 'nuance''. In Humphrey, C. and Lee, B. (eds.), *The Real Life Guide to Accounting Research: A Behind-the-Scenes View of Using Qualitative Research Methods*, pp. 391–407, Elsevier, Oxford.

Steenkamp, N. and Northcott, D. (2007). 'Content analysis in accounting research – The practical challenges'. *Australian Accounting Review*, 17 (3): 12–25.

Michael MacCormac Professor of Management
University College Dublin

Niamh Brennan

20th Annual Conference on

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The 2008 conference, organised by Malcolm Anderson, will be held at Aberdare Hall, Cathays Park, Cardiff, CF14 3UX, UK. It will commence at lunchtime on Thursday, 11 September 2008 and conclude in the late-afternoon of Friday, 12 September 2008.

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Application forms for a 2008 start should be returned to Gillian by **21 April 2008**.

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Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the paper shares data with another paper, an electronic copy of the other paper must be provided. Authors of accepted papers will also be asked to assign exclusive copyright to the publishers.

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Accounting Standards Steering Committee (1975). *The Corporate Report*. London: ASC.

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Watts, R.L. and Zimmerman, J.L. (1986). Positive Accounting Theory. Englewood Cliffs, NJ: Prentice Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

Accounting and Business Research

The impact of non-mandatory corporate governance on auditors' client acceptance, risk and planning judgments

Fairness of performance evaluation procedures and job satisfaction: the role of outcome-based and non-outcome-based effects

Intellectual capital disclosure and corporate governance structure in UK firms

Accounting and Business Research

Accounting and Business Research

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Contents

Forthcoming Articles

The next issue of the journal will be the Special Issue in collaboration with the Institute of Chartered Accountants in England and Wales, containing the papers and discussions arising from the International Accounting Policy Forum in December 2007. The five major papers in that issue are:

Sudipta Basu and Gregory Waymire, Has the importance of intangibles grown? And if so, why?

Douglas Skinner, How should intangibles be accounted for? A critical review of policy recommendations

Anne Wyatt, What financial and non-financial information on intangibles is value-relevant? A review of the evidence

Christopher Ittner, Does measuring intangibles for management purposes improve performance? A review of the evidence

Andrew Stark, Intangibles and research – an overview with a specific focus on the UK

Editorial Policy

Accounting and Business Research publishes papers containing a substantial and original contribution to knowledge. Papers may cover any area of accounting, broadly defined and including corporate governance, auditing and taxation. Authors may take a theoretical or an empirical approach, using either quantitative or qualitative methods. They may aim to contribute to developing and understanding the role of accounting in business. Papers should be rigorous but also written in a way that makes them intelligible to a wide range of academics and, where appropriate, practitioners. Presentation should be as elegant and economical as possible, avoiding unnecessary words, numbers or symbols.

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Editorial

I am pleased to announce that *Accounting and Business Research* has been selected for coverage in the Current Contents/Social and Behavioral Sciences (CC/S&BS) and the Social Sciences Citation Index (SSCI). This is an important development for this journal and opens up further exciting opportunities for the field of accounting research. I take this opportunity to thank all those who have contributed to the high quality of publications in the journal and look forward to working with authors, reviewers and the editorial board in continuous pursuit of publishing excellence in research.

Terry Cooke has retired from the editorial board. His support for the journal has been much appreciated and through his reviews he has provided valuable guidance to many researchers. We wish him well.

Pauline Weetman
Editor

The impact of non-mandatory corporate governance on auditors' client acceptance, risk and planning judgments

Divesh S. Sharma, El'fred Boo and Vineeta D. Sharma*

Abstract—We examine the effect of non-mandatory corporate governance practices on a comprehensive set of audit judgments.[1] We provide initial evidence on how auditors respond to corporate governance in an institutional environment where corporate governance is not mandated by law. Based on the agency and resource dependence theories, we hypothesise associations between corporate governance and auditors' judgments relating to client acceptance, risk assessments, and the extent and timing of substantive testing. Sixty Big 4 audit managers from Singapore are randomly assigned to one of three experimental conditions comprising weak, moderate and strong corporate governance. Our results show auditors make more favourable client acceptance judgments when corporate governance is stronger. Clients with stronger corporate governance are assessed as having lower control environment risk. After controlling for control environment risk, we find that stronger corporate governance increases auditors' reliance on the client's internal controls and reduces the extent of substantive tests. When corporate governance is stronger, we observe that auditors conduct more substantive testing during the interim period compared to the year-end. Our findings suggest that audit strategies are responsive to the strength of a client's corporate governance.

Key words: agency theory; corporate governance; resource dependence; audit judgment; Sarbanes-Oxley Act

1. Introduction

Following the 1997 Asian financial crises, the World Bank, IMF and the OECD required Asian nations, including Singapore, to address shortcomings in corporate regulations. Among others, Singapore responded by reforming corporate disclosure regulations and introducing the Code of Corporate Governance (the Code) in 2001. Compliance by listed companies is encouraged by the Singapore Stock Exchange (SGX). The Code addresses four areas of governance, namely, board of directors, remuneration, accountability and audit, and communication with shareholders. The nature of corporate governance set out in the Code follows the Anglo-American model because

Singapore is an international financial hub. It hosts many multinational companies and has a globally-oriented financial market.

The roles of the board of directors and its sub committees, such as the audit committee, outlined in the Singapore Code are similar to the US Sarbanes-Oxley Act (2002) (SOX) and the Combined Code (2006) of the UK. For example, the board and audit committee are responsible for ensuring the quality of the financial reporting system, the integrity and effectiveness of the internal control system, and appointing and remunerating the auditors. There are, however, some differences between the corporate governance environment in the US/UK and Singapore. Unlike the US, compliance with the Singapore Code is not mandatory. The Singapore Stock Exchange (SGX) requires companies to disclose their corporate governance practices and to explain non-compliance in their annual reports. The Singapore Code does not have legal force, unlike SOX in the US. The guidelines in the Singapore Code are principles-based which companies can tailor to their needs. The SOX, on the other hand, takes a prescriptive rules-based approach that companies must follow. For example, Section 404 of SOX requires auditors to attest to management's assessment of internal controls

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This paper was accepted for publication in January 2008.

[1] We use the term 'judgment' in the sense of 'decision' to be consistent with the prior literature (e.g. Cohen and Hanno, 2000; Cohen et al., 2007) examining client acceptance and other audit judgments.

over financial reporting. There is no such require-
ment in the Singapore Code. Finally, non-compli-
ance with SOX in the US has serious potential
consequences including financial penalties and
imprisonment for management and those responsi-
ble for overseeing compliance. The Singapore
Code does not specify such consequences.

These illustrative differences suggest that in an
institutional environment where corporate gover-
nance rules are mandated by law, non-compliance
has serious ramifications for management and
those responsible for overseeing compliance.
Therefore, auditors are expected to pay attention to
corporate governance practices in such a setting.
In an institutional setting where the adoption and
monitoring of corporate governance practices is
not mandatory and lacks legislative force, such as
Singapore, it is not clear how auditors would react
to voluntary adoption of principles-based guide-
lines. Singapore firms may implement governance
mechanisms that appear to comply with the Code
but in substance are 'tools' for managerial en-
trenchment. Such conditions raise an empirical
question about how the market and agencies such
as auditors perceive corporate governance struc-
tures implemented by Singapore companies.

In this study, we address the empirical question
of how the strength of non-mandatory corporate
governance affects Singapore auditors' judgments.
We extend prior research (e.g. Cohen and Hanno,
2000) by examining a more comprehensive set of
corporate governance factors, more recent data in
a period of significant reforms, and a different in-
stitutional setting. The extent to which auditors in
Singapore would rely on their clients' governance
mechanisms is unclear for two main reasons. First,
auditors in Singapore are cognisant of the non-
mandatory status of corporate governance prac-
tices and the discretion afforded to management
in the implementation and assessment of such
practices. Consequently, Singapore auditors may
'discount' and pay less attention to corporate gov-
ernance in their audit client risk assessments. On
the other hand, the 'push' for reforms by the World
Bank, IMF and OECD particularly in Asia, and
significant governance developments in the US
and the UK may influence Singapore auditors to
pay more attention to corporate governance as it
is the apex of a firm's control environment. An
incentive for auditors to focus on corporate gover-
nance is the presence of large US and UK multi-
national firms operating in Singapore as failure to
do so could result in adverse economic conse-
quences (i.e. lost fee revenues from audit and con-
sulting). Second, the small body of prior research
based in the US does not provide sufficient and un-
equivocal empirical evidence to suggest that audi-
tors plan their audit according to their perceptions
of the strength of a client's corporate governance.

More importantly, we do not know whether, and to
what extent, the results of the limited research in
the US can generalise to a non-mandatory corpo-
rate governance setting such as Singapore. Our
study also responds to the calls by Bedard and
Johnstone (2004), Cohen et al. (2004) and DeFond
and Francis (2005) for further research to enhance
our understanding of the role of corporate gover-
nance in the financial reporting and assurance
process, and to provide guidance to policy-makers
and audit practice.

Sixty audit managers from three Big 4 audit
firms are randomly allocated to one of three ex-
perimental treatment conditions – weak, moderate
and strong corporate governance. Our results show
significant differences in auditors' client accept-
ance, risk and planning judgments across the ex-
perimental conditions. We observe that auditors
make more favourable client acceptance, risk and
planning judgments when corporate governance is
stronger. The results generally suggest that audi-
tors adopt strategies responsive to the strength of a
client's corporate governance. Section 2 of the
paper reviews the relevant prior literature and de-
velops the hypotheses. We then describe the re-
search design and method (Section 3) followed by
the results (Section 4). Section 5 concludes with a
discussion of the findings and opportunities for
further research.

2. Literature review and hypotheses development

In this section, we review the prior behavioural lit-
erature on corporate governance and audit judg-
ments. We also describe the agency and resource
dependence theories, which provide the founda-
tion for our hypotheses. We view the agency and
resource dependence theories as complementary
because they provide explanations incremental to
each other on various aspects of a firm's environ-
ment and corporate governance. Boards conduct
monitoring activities (agency view) and provide
resources (resource dependence view). Hillman
and Dalziel (2003) contend that research that does
not integrate the agency and resource dependence
theories are myopic and such studies provide an
incomplete understanding of corporate gover-
nance.

2.1. Corporate governance and the audit process

A significant body of academic research has
emerged on the relationship between corporate
governance and the financial reporting process
(e.g. Beasley, 1996; Dechow et al., 1996; Beasley
et al., 1999; Klein, 2002; Abbott et al., 2004).
Although the audit process is a vital component of
the financial reporting process, there is a paucity
of research on corporate governance and audit
judgments (Bedard and Johnstone, 2004; Cohen

et al., 2004; DeFond and Francis, 2005). We review the relevant behavioural studies to date.

Cohen and Hanno (2000) investigate the impact of the quality of corporate governance and management control philosophy on pre-planning and planning judgments. Their results show that auditors are more likely to accept clients and reduce substantive testing for clients with stronger corporate governance. Contrary to expectations and professional guidance statements, no conclusive effects are observed on the timing of testing.

Cohen et al. (2002) interview auditors to explore the impact of corporate governance on the audit process. They report that all respondents, including seniors, managers and partners collect and use governance information when making their audit decisions. Their interviewees state that audit committees are ineffective and of secondary importance because they lack authoritative power. Cohen et al. (2002) report that auditors may increase their reliance on the audit committee if they are entrusted with greater power and responsibilities over the financial reporting process.

Finally, Cohen et al. (2007) investigate the impact of board focus (agency and/or resource dependence) on auditors' program planning judgments. In their experimental study, 68 audit partners and managers evaluate a case where the focus of the board is manipulated in a 2×2 between-subjects design: agency focus (stronger or weaker) and resource dependence focus (stronger or weaker). Their results show that when the board is assessed as stronger on the agency and resource dependence dimensions, auditors decrease planned audit hours. However, they find no significant effect of the board on inherent risk but some evidence of the effect of the board on control risk at conventional significance levels.

2.2. Corporate governance and client acceptance judgment

The client acceptance judgment is a critical first phase in the audit firm's risk management process, given the increasing risk of litigation and accounting scandals. Audit firms continue to devote considerable attention to the client acceptance judgment by evaluating client-related risks and adopting audit strategies to manage such risks to acceptable levels (Johnstone and Bedard, 2003; Bell et al., 1997). However, little is known about how auditors make the client acceptance judgment

(Johnstone, 2000) and particularly so in the current environment with client-business risk at heightened levels (Bedard and Johnstone, 2004).

When making the client acceptance judgment, auditors assess the engagement risk associated with a potential client. Engagement risk comprises three components: client's business risk, audit risk and auditor's business risk (Johnstone, 2000).[2] Johnstone (2000) shows that partners evaluate client-related risks to assess the audit firm's business risk in making a client acceptance judgment. However, she also finds that partners do not use proactive risk-adaptation strategies (e.g. adjusting the audit fee) to mediate the risk effects of the client acceptance judgment. Similarly, Johnstone and Bedard (2003) find that auditors do not adopt risk-adaptation strategies when making client acceptance judgments. Rather, auditors concentrate on identifying and screening out clients with unacceptable risks.

As the strength of the board of directors and audit committee is significantly associated with the quality of the financial reports (e.g. Beasley, 1996; Dechow et al., 1996; Beasley et al., 1999; Klein, 2002; Abbott et al., 2004), it potentially affects auditors' risk assessments. These findings in the literature are consistent with the agency view of the board and audit committee. Fama (1980) and Fama and Jensen (1983) posit that a firm's internal governance plays an important role in shaping and enhancing effective operation of its internal control system. The board of directors, through the audit committee, is the primary internal governance mechanism that is responsible for the effective oversight of the overall control environment. The effectiveness of this oversight function is largely dependent on the independence of the directors serving on the board and the audit committee (Fama, 1980; Fama and Jensen, 1983). Such independence comes from outside directors who have incentives to protect their reputation and avoid litigation risk.

Given the link between a client's strategies and the assertions in the financial statements, Bell et al. (1997) highlight the necessity for auditors to understand and place more weight on the processes that determine a client's business strategies. This implies that auditors should consider a firm's corporate governance because resource dependence theory posits that the board of directors plays a major role in setting and monitoring the firm's strategies and how the firm positions itself in its business environment to achieve its objectives (Pfeffer, 1972; Pfeffer and Salancik, 1978; Hillman and Dalziel, 2003). Resource dependence theory embraces the view that board members enhance the value of the firm through developing and monitoring a firm's strategic responses to deal with the dynamic and competitive environment. Pfeffer

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[2] Client business risk is the risk that the client's economic condition will deteriorate in either the short or long term. Audit risk is the risk that the auditor fails to appropriately modify his opinion on financial statements that are materially misstated. Auditor's business risk is the risk that the audit firm will suffer a loss from the engagement, arising either from a lack of engagement profitability or future litigation (Johnstone, 2000).

(1972), Pfeffer and Salancik (1978), Hillman and Dalziel (2003), and recent studies in accounting utilising resource dependence theory (Sharma, 2006; Cohen et al., 2007) argue that the ability of the directors to perform this role is dependent on their experience, industry knowledge and their understanding of the economic climate.

The economic consequences of the adopted strategies are reported in the financial statements. Thus, auditors may assess whether the firm is taking advantage of the resourcefulness and expertise of the board of directors to develop strategies to ensure its continuity as a going concern. If a client's economic condition deteriorates due to poor business strategies, the likelihood of financial misreporting and audit engagement risk are likely to increase. Since performance declines and financial misreporting are associated with relatively weaker corporate governance, we expect, *ceteris paribus*, client-related risks to decline in a stronger governance environment. Therefore, we hypothesise that:

H1: Stronger (weaker) corporate governance [board of directors and audit committee] will lead to more (less) favourable client acceptance recommendation.

2.3. Corporate governance and risk assessments

Corporate governance is an important entity-level factor that sets the tone for the overall control environment that has significant implications for auditors' risk judgments. We jointly examine control environment and inherent risk judgments since Messier and Austen (2000) find a knowledge-based dependence between auditors' assessment of inherent risk and control environment risk. We focus on entity-level risk assessments because corporate governance provides holistic monitoring of a client's control environment and the financial reporting process. Therefore, our reference to inherent risk and control environment risk is made at the entity level rather than at a particular transaction cycle level.

Inherent risk is a function of how a client responds to risks in its business environment. The strategic business process model suggests that organisations develop and modify strategies to fit its environment (Bell et al., 1997). The board of directors plays an important role in this process and

thus it could influence auditors' assessment of inherent risk. A stronger board of directors with relevant industry knowledge and experience is in a better position to manage strategies responsive to the environment (Pfeffer, 1972; Pfeffer and Salancik, 1978; Hillman and Dalziel, 2003; Sharma, 2006; Cohen et al., 2007). Such clients may be assessed lower inherent risk because they are less likely to face financial difficulties and engage in financial misreporting.

A weaker internal control environment is likely to be associated with higher control environment risk (Cohen and Hanno, 2000; Cohen et al., 2007) and greater likelihood of financial misreporting (Beasley, 1996). The strength of corporate governance is likely to affect auditors' control environment risk assessment because a strong (weak) board and audit committee are part of the overall control environment that provide the backbone for the effective (ineffective) operation of internal controls (Fama, 1980; Fama and Jensen, 1983; Cohen and Hanno, 2000; Cohen et al., 2007). Authoritative guidance statements (e.g. COSO, 1992; SOX, 2002) empower the board and audit committee to oversee the internal control system and management's financial reporting policies. The audit committee also mediates disagreements between the auditor and management with prior research showing a strong audit committee supporting the auditor (Carcello and Neal, 2000; 2003). This discussion suggests the following hypothesis:

H2: Stronger (weaker) corporate governance [board of directors and audit committee] will lead to lower (higher) inherent risk and control environment risk assessments.

2.4. Corporate governance and audit planning judgments

Professional standards require auditors to perform auditing procedures designed to reduce client-related risks to an acceptable level. As auditors' assessment of client-related risks increases, the level of audit effort required increases. Although theoretical predictions are quite clear, the empirical evidence in prior studies is unclear about auditors' sensitivity to client risk factors.[3] More importantly, we know very little about how a client's corporate governance, a client-risk factor, affects audit planning judgments. Auditing standards require auditors to understand sufficiently the components of internal control and to utilise this knowledge in making judgments concerning the nature, timing, and extent of substantive testing. Thus, corporate governance, which is often regarded as the apex of a firm's internal control system (Fama, 1980; Fama and Jensen, 1983), should affect the extent and timing of audit testing.

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[3] Behavioural experiments generally report evidence of risk responsiveness in planning judgments (e.g. Messier and Plumlee, 1987; Maletta and Kida, 1993; Zimbelman, 1997; Johnstone, 2000). However, archival studies report results indicating auditors' risk responsiveness are mixed. Some recent studies such as Bell et al. (2001) and Johnstone and Bedard (2001) report that auditors adapt their planning judgments to assessed risks, while other studies report that they do not (e.g. Mock and Wright, 1993). See also Bedard et al. (1999) for a comprehensive review of the related literature.

2.4.1. Corporate governance and extent of planned substantive testing

To our knowledge, the small body of literature examining the impact of corporate governance on substantive testing is based in the US. Therefore, we do not know whether the results observed in the US, where corporate governance standards are mandated, can be generalised to a non-mandatory corporate governance setting such as Singapore. As explained earlier, because auditors in Singapore may either 'discount' or emphasise a client's corporate governance when making audit judgments (see 'Introduction' section), we do not know the extent to which corporate governance would influence auditors' substantive test judgments. Furthermore, the results of prior studies are inconsistent and are probably due to the different perspectives taken by the researchers. These studies adopt either a risk-based or a demand-based perspective. The three behavioural studies to date employ the risk-based perspective. Cohen et al. (2002: 580) adopt a risk-based perspective and propose that:

'For governance factors to affect audit plans, the auditor must first recognize and properly assess the strength of corporate governance and, second, appropriately weight and use this evidence to develop an audit plan. If the governance structure is strong, an auditor could potentially reduce sample sizes (e.g. number of locations visited for the evaluation of inventory) and thus reduce the extent of costly substantive testing.'

Cohen and Hanno (2000) report results consistent with the risk-based perspective described above by showing that corporate governance has a direct significant effect on auditors' planned extent of substantive tests. More recently, Cohen et al. (2007) show that a client characterised by a board with stronger agency focus and resource dependence focus reduces the number of planned audit hours compared to a typical audit.

Adopting a demand-based perspective in their archival study, Carcello et al. (2002) examine the relationship between board characteristics and audit fees for Fortune 1000 companies. They find that a stronger board demands closer audit scrutiny and quality which suggests greater audit effort by the external auditor and higher audit fees. In contrast, Bedard and Johnstone (2004) do not observe significant direct effects between corporate governance and audit effort and audit billing rate, implying that there is limited support for the demand-based perspective. They suggest the risk-based approach provides a more plausible explanation of the association between corporate governance and audit effort expended on audit tests.

We adopt a risk-based perspective as our study examines auditors' perceptions and responsive adaptation to a client's corporate governance. Our position is further supported by auditors increasingly placing more focus on the risk-driven approach in conducting their audit (Bell et al., 1997; Cohen et al., 2002). A risky client will require greater audit effort in order to reduce audit risk to an acceptable level. The agency and resource dependence theories suggest that stronger boards of directors and audit committees are associated with stronger controls and lower risks of financial misreporting. Such beliefs could result in greater reliance on internal controls and lower planned substantive testing. Thus, we hypothesise that:

H3a: Stronger (weaker) corporate governance [board of directors and audit committee] will lead to greater (lower) auditor reliance on internal control.

H3b: Stronger (weaker) corporate governance [board of directors and audit committee] will lead to less (more) extensive substantive audit testing.

2.4.2. Corporate governance and timing of substantive testing

Investigating the timing of audit testing is important because the timing of substantive procedures has implications for audit efficiency and effectiveness. For instance, emphasis on year-end testing can increase staff hours, impose pressures to meet deadlines, and create staff shortages (McNair, 1991). The study on governance and the timing of audit testing by Cohen and Hanno (2000) finds significant uncertainty and lack of consensus regarding the effects of corporate governance on adjustments to the timing of audit testing.

We propose that if auditors perceive stronger corporate governance, then more substantive testing may be shifted to interim periods. Although clients are more likely to manipulate their earnings near the financial year-end, the agency view suggests that stronger boards of directors and audit committees reduce such efforts and lead to higher earnings quality (e.g. Beasley, 1996; Dechow et al., 1996; Beasley et al,. 1999; Klein, 2002; Abbott et al., 2004). Effective monitoring by the board and audit committee increases the strength of the internal controls and reduces the risk of material misstatements. Under such conditions, auditors are likely to perform more substantive tests during the interim period. This leads to our final hypothesis:

H4: Stronger (weaker) corporate governance [board of directors and audit committee] will lead to auditors conducting more (less) substantive testing during the interim period.

3. Research design and method

3.1. Experiment overview

We randomly assigned participants to one of three experimental conditions: weak, moderate or strong corporate governance. All participants in the experiment received detailed information on a prospective client's board of directors and audit committee, and other background information to make judgments pertaining to client acceptance, risk, and audit planning related to the extent and timing of substantive tests. Background information, such as management integrity, industry, client size and financial health of the client, is held constant across experimental conditions since our main objective is to analyse the effect of corporate governance on auditors' judgments. These variables are selected based on our review of the prior literature. We provide the same background description of the hypothetical client in the experimental instrument for each treatment condition. Client background information provided to participants include products manufactured, industry information (intensity of competition, major competitors and their market share, client's market share), size (number of employees), founding year and listing status, ownership data, management integrity, and predecessor auditor. We also provide financial statements containing two years of data and financial ratios for each year including the percentage change from the prior year and industry comparatives. The hypothetical company, Alpha Ltd, is a recently-listed manufacturer of computer hardware components and has moderate financial health.[4] The research instrument, including the debriefing and demographic questions, is developed in consultation with the participating Big 4 firms.

3.2. Participants

Audit managers from three of the Big 4 audit firms in Singapore participated in the study. We liaised with the contact partner or manager at each firm. In our preliminary discussions and during the pilot tests, we canvassed usual experimental issues with emphasis on auditors' understanding of corporate governance and its implications for financial reporting and the external audit. Each participating audit firm provided considerable in-house and external training to their auditors on corporate governance issues. We also reviewed Big 4 firms' publications that disseminate corporate governance developments to staff and clients. We include only audit managers in our study and exclude lower level staff as the latter are less likely to have sufficient experience and knowledge to address corporate governance issues and make appropriate planning and client acceptance judgments.

All participants hold a university degree and

57% are males. The mean audit experience of the managers is 7.15, 5.98 and 7.37 years, respectively for the weak, moderate and strong governance treatment conditions. The use of audit managers is appropriate for reasons that they work closely with audit partners and assist in the client acceptance judgment. The audit managers indicated that they have prior involvement in the client acceptance process. At least 50% of the participants had discussed issues related to client acceptance with external parties such as prior auditors, bankers, and lawyers; 80% had previously evaluated a new client's financial status; 88% had gathered background information on a potential client; 88% previously evaluated a new client's internal control environment; and 92% of auditors had prior experience evaluating a new client's financial reporting system. Although audit partners make the final client acceptance decisions, only in exceptional circumstances would they deviate from the audit managers' recommendations. ANOVA results show no significant differences ($p > 0.10$) among the three treatment conditions with respect to the various activities and the experience (in years) of the audit managers. This suggests our random allocation is successful.

We conducted the pilot study and experiment in December 2002, following the publication of the Singapore Code in early 2001. The Big 4 in Singapore implemented specialist corporate governance teams/centres following the Asian financial crisis and injected further resources when the Singapore governance code was first drafted.

Experimental instruments were delivered to each of the audit firm's representative in random order.[5] We instructed the representatives to randomly distribute the sealed envelopes containing the experimental instrument. All responses were anonymous and confidential. The research instruments ask participants to complete the experimental tasks individually and without discussion with their peers. As the participants completed the experimental tasks in their own time, we were unable to verify individual completion. Our discussion with the contact person at each of the participating Big 4

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[4] We determined Alpha's moderate financial health by developing its financial statements based on industry averages and reviewing several listed companies' financial statements. We resized the draft financial statements and included them with selected financial ratios in our pilot tests. Using a seven-point scale for the financial items anchored (1) very low to (7) very high, several audit partners (n=4) and managers (n=9) participating in our pilot tests assessed the financial health of Alpha as moderate. These auditors were provided the complete experimental instrument and made their judgments on the items and scales as described in the method section. The mean for the four financial status items ranged between 3.46 and 4.18.

[5] The experimental instrument is available upon request from the corresponding author.

firms before and after the experiment did not indicate any problem with task completion.[6]

We achieved a response rate of 58% based on the distribution of 105 research instruments.[7] We removed one incomplete instrument which resulted in 60 usable responses that are equally distributed across the three experimental conditions. We could not ask for more participants because of resource constraints expressed by the participating firms. Although we do not achieve our minimum sample size per cell, our post hoc power and effect size analyses reported in the 'Results' section indicate that we achieved high power and large effects. Accordingly, we do not need a larger sample size per cell (Cohen, 1988).

3.3. Independent variables

The experimental treatment in our study is the strength of corporate governance manipulated as weak, moderate or strong along dimensions of corporate governance that are identical across our three experimental conditions. Our experimental construct is based on corporate governance regulations, findings in the prior literature (Carcello and Neal, 2000; Cohen and Hanno, 2000; Cohen et al., 2002; Carcello and Neal, 2003; Bedard and Johnstone, 2004) and governance practices by companies. The three experimental conditions with respect to board and audit committee characteristics are summarised in Exhibit 1. We include a column in Exhibit 1 that relates the various dimensions of corporate governance to the agency and resource dependence theories and are identified as 'agency' and 'resource', respectively, and those related to both are identified as 'agency & resource'.

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[6] We assess random distribution of audit managers from the three Big 4 audit firms across the three experimental conditions and find the Chi-square statistic is not significant (χ^2 = 6.976, p = 0.14). We also included audit firm affiliation as a covariate in all our analyses and find it is not significant in all tests nor does it influence our results in any way.

[7] To ensure our statistical analyses have sufficient statistical power for making valid inferences, we estimated our sample size for each cell based on a range of medium (f = 0.25) to large (f = 0.40) effect size and high statistical power (0.80) at an alpha of 5%. A practically meaningful effect size in the social sciences is greater than a small effect size (see Cohen, 1988 for details). Using these parameters and tables in Cohen (1988), we estimated a minimum sample size of 21 and maximum of 52 participants per cell.

[8] We include a question asking respondents to assess the integrity of management, a variable we control. We include this question here rather than as part of our manipulation check questions because auditors in our pilot test stated this is one of the foremost client factors they evaluate.

[9] Although the accept/reject scale had an increasing order, 1 at the reject end and 6 at the accept end, the respondents formed their own interpretations of the meaning of the numbers 1–3 in the reject region, and 4–6 in the accept region.

[10] In practice, auditors use scales with verbal anchors such as 'low', 'moderate' and 'high' when making audit judgments. Consistent with the prior literature, we attach numerical anchors to facilitate statistical analyses.

The column also identifies the theoretical construct (e.g. independence, expertise, experience, reputation) associated with the governance dimensions.

We provide descriptive information about the activities of the board and audit committee, and background information of each director such as their experience, qualifications and outside directorships. Some of the corporate governance information presented in the experimental instruments is commonly disclosed in annual reports. Based on such information, participants in the experiment have to form their own judgments about the effectiveness of the hypothetical client's corporate governance. This is reflective of the condition in practice where auditors assess the strength of corporate governance based on their observations of directors' characteristics such as independence, experience, expertise and reputation. Participants are not specifically told whether the board or audit committee is effective in discharging its responsibilities. By doing so, we also minimise any internal validity threats arising from demand characteristics.

3.4. Dependent variables

The dependent variables comprise client acceptance, risk, and audit planning judgments. They are elicited based on questions in the research instrument.[8] The first question asks respondents to indicate on a six-point scale whether they recommend accepting or rejecting the client, where one to three are categorised on the scale as 'reject', and four to six are categorised as 'accept'.[9] For the purposes of statistical analysis, a higher number represents a more favourable client acceptance recommendation. An even-numbered scale ensures respondents make a choice between accept or reject.

For the remainder of the judgment tasks, participants respond on a seven-point Likert scale ranging from 'very low' (1) to 'very high' (7).[10] The second question asks participants to rate the integrity of management followed by questions related to inherent risk and control environment risk. Control environment risk as elicited in our experiment is more narrowly defined as the risk relating to the control environment. As this definition is limited to entity-level risk, our results may not be comparable to prior research that examines control risk at the specific financial statement assertion level. Participants are also required to make four audit planning judgments. These four questions comprise the extent of auditor's planned reliance on the client's internal controls, the number of planned audit hours required to complete the audit, the extent of planned substantive tests, and the extent of substantive tests planned for the year-end audit.

Exhibit 1
Experimental manipulation of corporate governance

Strong	Moderate	Weak	Theory (construct)
Majority of independent directors on the board	Equal numbers of independent and non-independent directors on the board	Majority of non-independent directors on the board	Agency (independence)
Board has independent and full access to the company's information and senior management	Board has access to company's information and senior management	Board does not have independent and full access to company's information and senior management	Agency (independence)
Chairman of board is an independent outsider	The CEO also serves as the Chairman of the board	The CEO also serves as the Chairman of the board	Agency (duality)
Board met eight times during the financial year and all meetings received full attendance	Board met five times during the year and all meetings except one received full attendance	Board met three times during the year and all meetings did not receive full attendance	Agency (diligence)
All directors have accounting and/or finance expertise	Four out of six directors have accounting and/or finance expertise	Three out of six directors have accounting and/or finance expertise	Agency (expertise)
All directors except one hold outside directorships	Four out of six directors hold outside directorships	Only one director holds an outside directorship	Agency (reputation) & Resource (experience, expertise, networking)
Directors have an average of 10.8 years of experience as a director	Directors have an average of 4.3 years of experience as a director	Directors have an average of 2.7 years of experience as a director	Resource (experience)
All outside directors have relevant industry experience	Some outside directors have relevant industry experience	None of the outside directors have relevant industry experience	Resource (industry knowledge)
Audit committee is comprised solely of independent directors	Audit committee has two out of three independent directors	Audit committee has a majority of non-independent directors	Agency (independence)
Audit committee met regularly with the internal and external auditors without top management present	Audit committee met occasionally with the internal and external auditors without top management present	Little communication between the audit committee and external auditors	Agency (independence & diligence)

Exhibit 1
Experimental manipulation of corporate governance (*continued*)

Strong	Moderate	Weak	Theory (construct)
Audit committee met six times during the financial year	Audit committee met four times during the year	Audit committee met three times during the year	Agency (diligence)
All audit committee members have accounting and/or finance expertise	All audit committee members have accounting and/or finance expertise	One out of three audit committee members have accounting and/or finance expertise	Agency (expertise)
All audit committee members hold outside directorships	Two out of three audit committee members hold outside directorships	None of the audit committee members hold an outside directorship	Agency (reputation) & Resource (experience, expertise)
Audit committee members have an average of nine years of experience as a director	Audit committee members have an average of 3.7 years of experience as a director	Audit committee members have an average of 2.7 years of experience as a director	Resource (experience)

3.5. Pilot test

Thirteen auditors from the Big 4 firms not taking part in the main study pre-tested the experimental instruments. We also asked them to consider the realism of the case, the nature and amount of information provided including the background, corporate governance and financial results of the client. They were also asked to comment on their understanding and order of the audit judgment questions. Following the pilot-test, we made some editorial changes to the research instruments and added the notes accompanying the complete financial statements. Our discussions with the auditors indicated they had no problems understanding the case and the questions. They confirmed that the nature and sequence of the questions follow practice although they mentioned that some judgments (e.g. risk assessments) are made simultaneously.

4. Results

4.1. Manipulation check and descriptive statistics

We check the manipulation of our experimental treatments based on participants' rating of each of the following: (i) the overall strength of the client's corporate governance (GOV)[11] (ii) board of directors (BOD) and; (iii) the audit committee (AC) on separate seven-point Likert scales ranging from 'very low' (1) to 'very high' (7). Since these are related variables, we perform a MANOVA (Wilks' Lambda statistical test) followed by post-hoc tests.[12]

The MANOVA results show that our manipulation of governance is significantly different (Wilks' Lambda = 0.29, F = 24.0, p < 0.01) across the treatment conditions for GOV, BOD and AC. The group means (SD) for GOV are 2.65 (0.745), 4.05 (1.099) and 5.10 (0.718) for the weak, moderate and strong corporate governance treatment conditions, respectively. The group means (SD) for BOD are 2.80 (0.834), 4.20 (0.951) and 5.25 (0.967) for the weak, moderate and strong treatment condi-

tions, respectively. For AC, the group means (SD) are 2.25 (0.851), 4.35 (1.040) and 5.55 (0.945) for the weak, moderate and strong treatment conditions, respectively. Our post-hoc tests of mean differences show significant differences (p < 0.01) in participants' ratings for both BOD and AC between the weak and strong, weak and moderate, as well as moderate and strong governance treatment conditions. We conclude that participants perceived the strength of the board and audit committee as intended by our experimental manipulations.

We also ask participants to rate the financial status of the hypothetical client on four dimensions (i.e. profitability, liquidity, leverage and operating activity) that are held constant across the three treatment conditions. We find no significant differences in participants' ratings of financial status across the three treatment conditions.[13] Recall that participants also rate the integrity of management as part of their audit judgments, consistent with what auditors do in practice. We observe some differences in management integrity ratings but these are significant (p < 0.05) between the weak and strong governance conditions only. When we include management integrity as a covariate in our analyses, it is not significant and it does not qualitatively affect the effects of corporate governance.[14]

Table 1 presents the correlation matrix for all the dependent variables. The data in Table 1 show significant correlations among the audit judgment variables. For example, control environment risk is highly and positively correlated with the extent of planned substantive testing (r = 0.47, p < 0.01). This is not unexpected as audit judgments are interrelated. We design and use appropriate statistical analyses that consider these inter-relationships.

4.2. Test of hypotheses

4.2.1. Corporate governance and client acceptance judgments

The ANOVA results in Table 2, Panel A show that corporate governance (GOVSGH)[15] significantly influences auditors' client acceptance judgment (F = 11.356, p < 0.01). The means (SD) for the ACCEPT judgment in Table 2, Panel B are 3.95 (0.826), 4.85 (0.671) and 4.95 (0.686) for the weak, moderate and strong governance treatment conditions, respectively. The results for test of H1 in Table 2 show a significant difference (p < 0.01) for ACCEPT across the corporate governance treatment conditions. The post-hoc analyses in Panel C show significant differences (p < 0.01) between the weak and strong, and between the weak and moderate corporate governance conditions. On the other hand, ACCEPT is not significantly different between the strong and moderate treatment conditions. The results suggest that auditors make more favourable client acceptance recommendations

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[11] 'Overall governance refers to a respondent's total perception of the combination of: activities and composition of the client's board of directors; the audit committee; and the background of the directors.

[12] MANOVA is a multiple analysis of variance test and is used when there are two or more related dependent variables (Hair et al., 1995).

[13] For each treatment condition, weak, moderate and strong, the mean (SD), F and p-values are: (1) profitability: 3.35 (0.59), 3.15 (0.88) and 3.65 (0.88), F = 2.025, p > 0.10; (2) liquidity: 4.60 (0.94), 4.95 (0.99), 5.10 (1.16), F = 1.219, p > 0.10; (3) leverage: 3.85 (1.18), 3.40 (0.94), 3.55 (1.05), F = 0.931, p > 0.10; and (4) operating activity: 4.45 (0.61), 4.05 (0.95), 4.15 (0.75), F = 1.434, p > 0.10.

[14] The F-values and relevant levels of significance for management integrity as a covariate in our analyses reported in Tables 2 to 4 range between 1.653 (p = 0.19) to 0.972 (p = 0.413).

[15] GOVSGH represents the three treatment conditions: weak, moderate or strong governance.

Table 1

Pearson correlations for audit judgment (dependent) variables (n = 60)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) ACCEPT	1.000						
(2) INHRK	−0.203	1.000					
(3) CONRK	−0.136	0.459***	1.000				
(4) PLAINTCT	0.306**	−0.014	−0.357***	1.000			
(5) PLAUDHR	−0.305**	0.236*	0.240*	−0.209	1.000		
(6) PLASUBT	−0.294**	0.336***	0.469***	−0.502***	0.720***	1.000	
(7) PLASUBYE	−0.312**	0.090	0.254**	−0.734***	0.420***	0.504***	1.000

Key to Table 1

ACCEPT	Auditors' client acceptance/rejection recommendation measured on a 1–6 point scale where 1–3 represents reject and 4–6 represents accept.
INHRK	Auditors' assessment of inherent risk measured on a 1–7 point scale where higher values indicate greater risk.
CONRK	Auditors' assessment of control environment risk measured on a 1–7 point scale where higher values indicate greater risk.
PLAINTCT	Auditors' assessment of the extent of planned reliance on the client's internal controls measured on a 1–7 point scale where higher values indicate greater reliance.
PLAUDHR	Auditors' assessment of planned audit hours the client requires measured on a 1–7 point scale where higher values indicate greater numbers of audit hours required.
PLASUBT	Auditors' assessment of the extent of planned substantive testing measured on a 1–7 point scale where higher values indicate greater extent of testing.
PLASUBYE	Auditors' assessment of the extent of substantive tests planned for the year-end audit measured on a 1–7 point scale where higher values indicate higher amounts of substantive tests planned.

*** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$

when corporate governance is stronger, which provides partial support for our hypothesis.[16]

4.2.2. Corporate governance and risk assessments

Since the correlations in Table 1 indicate significant correlations among auditors' assessment of control environment risk (CONRK) and auditors' assessment of inherent risk (INHRK), we test H2 using a MANOVA. The MANOVA results in Table 3, Panel A show that corporate governance (GOVSGH) significantly influences auditors' risk assessments (Wilks' Lambda = 0.749, F = 4.357, $p < 0.01$). The mean (SD) ratings for INHRK are 4.25 (0.716), 3.90 (0.718) and 4.05 (1.234) for the weak, moderate and strong governance treatment conditions, respectively. The mean (SD) ratings for CONRK are 4.20 (0.951), 4.10 (0.852) and 3.25 (0.910) for the weak, moderate and strong governance treatment conditions, respectively. Analysis of Variance test results in Panel B show that CONRK (F = 6.645, $p < 0.01$) is significantly influenced by corporate governance whereas INHRK (F = 0.725, $p > 0.10$) is not.

Further analyses in Panel C indicate significant differences in CONRK between the weak and strong governance treatment conditions ($p < 0.01$), and between the moderate and strong governance treatment conditions ($p < 0.01$). Surprisingly there is no difference in CONRK between the weak and moderate conditions. We do not offer any explanation for this observation. We believe further research is required to confirm and understand our observation. Overall,

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[16] We also conduct Chi-square tests of the client acceptance recommendation by analysing client acceptance and rejection recommendations as a dichotomous variable. The six-point scale for this judgment anchored scale-points 1–3 as reject and 4–6 as accept. There were seven reject recommendations made by auditors in the weak governance condition and none in the moderate and strong governance conditions. Our results show auditors in the weak governance condition recommend statistically significantly ($\chi^2 = 35.267$, $p < 0.01$) more client rejections than the auditors in the moderate and strong governance conditions. There was no statistically significant difference in auditors' client acceptance recommendations between the moderate and strong governance conditions. We also note that auditors in the weak governance condition made more borderline recommendations (scores on the six-point scale as 3 and 4 – refer 'Research Design and Method' section) relative to those in the moderate and strong governance conditions. The percentages of auditors making such recommendations are 70%, 30% and 25% for the weak, moderate and strong governance conditions, respectively. These proportions differ significantly between the weak, and the moderate and strong governance conditions ($\chi^2 = 43.000$, $p < 0.01$).

Table 2
Effect of the strength of corporate governance on auditors' client acceptance judgment

Panel A: ANOVA of corporate governance strength (GOVSGH) on ACCEPT

	F	p	Partial Eta Sq	Power
Intercept	2359.401	0.000	0.976	1.000
GOVSGH	11.356	0.000	0.285	0.990

Panel B: Summary statistics for ACCEPT

	Weak governance n = 20		Moderate governance n = 20		Strong governance n = 20		
	Mean	SD	Mean	SD	Mean	SD	F
ACCEPT	3.95	0.826	4.85	0.671	4.95	0.686	11.356***

*** = p < 0.01, ** = p < 0.05, * = p < 0.10

Panel C: Post-hoc analyses (difference in means) on ACCEPT

	Weak v strong governance	Weak v moderate governance	Moderate v strong governance
ACCEPT	1.00 (4.327)***	0.90 (3.894)***	0.10 (0.424)

Key to Table 2

ACCEPT: Auditors' client acceptance/rejection recommendation measured on a 1–6 point scale where 1–3 represents reject and 4–6 represents accept.

GOVSGH: Represents the three treatment conditions, weak, moderate or strong governance.

*** = p < 0.01, ** = p < 0.05, * = p < 0.10 (one-tailed significance)

the results in Table 3 are consistent with our hypothesis and suggest that when auditors perceive stronger governance they lower their assessment of control environment risk. The mean ratings for INHRK do not vary significantly between the three treatment conditions, implying that auditors do not emphasise corporate governance when assessing inherent risk. These results are consistent with Cohen et al. (2007).

4.2.3. Corporate governance and extent of planned substantive testing

We conduct a MANCOVA to test H3a, H3b and H4 because of significant correlations among the dependent variables, the extent of planned reliance on the client's internal controls (PLAINTCT), extent of planned substantive testing (PLASUBT), and the extent of substantive tests planned for the year-end (PLASUBYE). Auditors' assessment of control environment risk (CONRK)[17] is the covariate. The MANCOVA results in Table 4, Panel A show the strength of corporate governance (GOVSGH) significantly influences PLAINTCT, PLASUBT and PLASUBYE (Wilks' Lambda = 0.669, F = 4.012, p < 0.01). This effect is observed after controlling for the effect of CONRK which is significant as well (F = 4.317, p < 0.01). As presented in Table 4, Panel B, the mean ratings (SD) for PLAINTCT are 3.10 (0.852), 4.10 (0.968) and 4.70

(0.923) for the weak, moderate and strong governance treatment conditions, respectively. These means are significantly different (F = 11.246, p < 0.01). Similarly, the mean ratings (SD) for PLASUBT are 4.90 (0.968), 4.15 (0.875) and 3.75 (0.967) for the weak, moderate and strong governance treatment conditions, respectively, and they are significantly different (F = 4.468, p < 0.05).[18]

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[17] We control for control environment risk for two reasons: (1) theoretically, control environment risk affects the nature and extent of substantive tests, and (2) our results show a significant association between corporate governance and control environment risk. Including control environment risk as a covariate allows us to distinguish and isolate the extent of influence corporate governance has on substantive tests. If we do not include the covariate, CONRK, we find a more significant and larger effect of GOVSGH (MANOVA results: Wilks Lambda = 0.607, F = 5.197, p = 0.00, Partial Eta Squared = 0.221, and Power = 0.993) on auditors' planning judgments (PLAINTCT, PLASUBT and PLASUBYE). This suggests that in some cases where the results are marginal, exclusion of the covariate increases the significance of the effect of corporate governance.

[18] The mean ratings (SD) for PLAUDHR (extent of planned audit hours) are 4.90 (0.968), 4.40 (0.754), and 4.10 (0.718) for the weak, moderate and strong governance conditions, respectively, and are significantly different (F = 3.335, p < 0.05). We exclude this variable from the MANCOVA at the suggestion of a reviewer because it is highly correlated with PLASUBT (r = 0.720, p < 0.01). Inclusion of this variable in the MANCOVA does not affect the results.

Table 3
Effect of the strength of corporate governance on auditors' risk judgments

Panel A: MANOVA of corporate governance strength (GOVSGH) on INHRK and CONRK

	Wilks Lambda	F	p	Partial Eta Sq	Power
Intercept	0.037	736.044	0.000	0.963	1.000
GOVSGH	0.749	4.357	0.003	0.135	0.924

Panel B: Summary statistics and ANOVA for INHRK and CONRK

	Weak governance n = 20		Moderate governance n = 20		Strong governance n = 20		
	Mean	SD	Mean	SD	Mean	SD	F
INHRK	4.25	0.716	3.90	0.718	4.05	1.234	0.725
CONRK	4.20	0.951	4.10	0.852	3.25	0.910	6.645***

*** = p < 0.01, ** = p < 0.05, * = p < 0.10

Panel C: Post-hoc analyses (difference in means) on INHRK, CONRK and AUDRK

	Weak v strong governance	Weak v moderate governance	Moderate v strong governance
INHRK	0.20 (0.685)	0.35 (1.199)	0.15 (0.514)
CONRK	0.95 (3.322)***	0.10 (0.350)	0.85 (2.972)***

Key to Table 3

INHRK	Auditors' assessment of inherent risk measured on a 1–7 point scale where higher values indicate greater risk.
CONRK	Auditors' assessment of control environment risk measured on a 1–7 point scale where higher values indicate greater risk.
GOVSGH	Represents the three treatment conditions, weak, moderate or strong governance.

*** = p < 0.01, ** = p < 0.05, * = p < 0.10 (one-tailed significance)

The results in Table 4, Panel B show that PLASUBYE is significantly (F = 4.559, p < 0.05) influenced by GOVSGH. The mean (SD) ratings for PLASUBYE shown in Panel B are 4.75 (0.967), 4.10 (0.968) and 3.60 (1.095) for the weak, moderate and strong governance treatment conditions, respectively.

The results of our post-hoc analyses in Panel C of Table 4 show significant differences (p < 0.05 or better) in auditors' ratings for PLAINTCT between all treatment conditions. Similarly, PLASUBT is significantly (p < 0.01) different between the weak and strong, and weak and moderate governance treatment conditions. It is marginally different (p < 0.10) between the moderate and strong governance treatment conditions. The results in Panel C of Table 4 show PLASUBYE is significantly different between the weak and strong (p < 0.01), and weak and moderate (p < 0.05) governance treatment conditions, and marginally significantly (p < 0.10) different between the moderate and strong governance treatment conditions.

Overall, our observations suggest that when auditors perceive stronger corporate governance, they increase their reliance on internal control and reduce the extent of substantive testing. The converse is true for weaker corporate governance. These findings are consistent with H3a and H3b. Similarly, our results imply that auditors plan a greater extent of substantive testing during the interim period when corporate governance is stronger. This is consistent with H4. Our results provide empirical support for Cohen et al.'s (2002) proposition. Based on their interviews with auditors, Cohen et al. (2002) propose that stronger corporate governance should allow auditors to rely on the internal controls in place, and hence reduce the extent of costly substantive testing. Our significant results for the effect of the strength of corporate governance on audit judgments are beyond that explained by control environment risk. This suggests that corporate governance has implications that extend beyond the control environment. Such a view is consistent with the resource dependence theory that argues corporate governance influences corporate strategy and performance.

Table 4
Effect of the strength of corporate governance on auditors' planning judgments

Panel A: MANCOVA of corporate governance strength (GOVSGH) on PLAINTCT, PLASUBT and PLASUBYE with CONRK as the covariate

	Wilks Lambda	F	p	Partial Eta Sq	Power
Intercept	0.235	58.642	0.000	0.765	1.000
GOVSGH	0.669	4.012	0.001	0.182	0.966
CONRK	0.807	4.317	0.008	0.193	0.842

Panel B: Summary statistics and ANOVA for PLAINTCT, PLASUBT and PLASUBYE on GOVSGH

	Weak governance n = 20		Moderate governance n = 20		Strong governance n = 20		
	Mean	SD	Mean	SD	Mean	SD	F
PLAINTCT	3.10	0.852	4.10	0.968	4.70	0.923	11.246***
PLASUBT	4.90	0.968	4.15	0.875	3.75	0.967	4.468**
PLASUBYE	4.75	0.967	4.10	0.968	3.60	1.095	4.559**

*** = p < 0.01, ** = p < 0.05, * = p < 0.10

Panel C: Post-hoc analyses (difference in means) on PLAINTCT, PLASUBT and PLASUBYE

	Weak v strong governance	Weak v moderate governance	Moderate v strong governance
PLAINTCT	1.60 (5.517)***	1.00 (3.448)***	0.60 (2.069)**
PLASUBT	1.15 (3.885)***	0.75 (2.534)***	0.40 (1.351)*
PLASUBYE	1.15 (3.538)***	0.65 (2.031)**	0.50 (1.563)*

Key to Table 4

PLAINTCT	Auditors' assessment of the extent of planned reliance on the client's internal controls measured on a 1–7 point scale where higher values indicate greater reliance.
PLASUBT	Auditors' assessment of the extent of planned substantive testing measured on a 1–7 point scale where higher values indicate greater extent of testing.
PLASUBYE	Auditors' assessment of the extent of substantive tests planned for the year-end audit measured on a 1–7 point scale where higher values indicate higher amounts of substantive tests planned.
CONRK	Auditors' assessment of control environment risk measured on 1–7 point scale where higher values indicate greater risk.
GOVSGH	Represents the three treatment conditions, weak, moderate or strong governance.

*** = p < 0.01, ** = p < 0.05, * = p < 0.10 (one-tailed significance)

5. Discussion and conclusions

We hypothesise effects of the board and the audit committee on a comprehensive set of audit judgments in an institutional environment where corporate governance is not mandated by law but adoption is voluntary. Our results based on 60 Big 4 audit managers from Singapore show that

when corporate governance is stronger, auditors make more favourable client acceptance recommendations, assess lower control environment risk, place greater reliance on internal controls, perform less extensive substantive tests, and perform more substantive testing at the interim audit.[19] These results suggest that auditors in Singapore engage in risk-adaptation strategies, which is consistent with prior findings in the US (Messier and Plumlee, 1987; Maletta and Kida, 1993; Johnstone, 2000) and more recent US governance research (e.g. Cohen et al., 2007).

Our test results show that although auditors perceive differences between the strong and moderate corporate governance conditions, such differences are perceived not as significant as those between the weak and strong governance conditions. These differences suggest that the risk reduction effect of

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[19] Conversion of our reported effect size statistics, the Partial Eta-squared, in Tables 2 to 4 to its equivalent effect size, f, yields a minimum effect size of 0.40 and a maximum effect size of 0.63. The resultant fs are large effects (Cohen, 1988) and suggest that corporate governance has considerable practical or economic significance for audit judgments. That is, in addition to being statistically significant, our results indicate that auditors find corporate governance important and useful when making audit judgments. The statistical power results suggest our analyses are reliable and the inferences drawn are valid.

corporate governance on audit program planning judgments is greater when corporate governance improves from weak to strong than from moderate to strong.

Consistent with Cohen et al. (2007), we find no significant effect of corporate governance on inherent risk. This could be due to one or more of the following and deserves further research. First, because of knowledge-based dependence between inherent risk and control environment risk (Messier and Austen, 2000), auditors may have given greater weight to corporate governance in the control environment risk judgment than in the inherent risk judgment. Second, it is possible that auditors do not recognise corporate governance as an inherent risk factor although it plays a significant role in the strategic process of the organisation. Development of decision aids and/or training may be useful to enhance auditors' understanding and utilisation of corporate governance information when making inherent risk, and perhaps, other audit judgments.[20]

There are limitations in our study. First, our manipulation of the resource dependence aspect of corporate governance was limited to the structure of the board and audit committee. We encourage future research to manipulate board processes (e.g. directors' involvement in board activities, number of board sub-committees directors serve on, industry networks) to provide greater insight on how various dimensions of resource dependence aspects of governance affect decision making. Second, we manipulate corporate governance treatment on an assumption that the strength of the audit committee derives linearly from the board. That is, the audit committee is strong (weak) when the board of directors is strong (weak). Future research may manipulate the strength of both the board of directors and audit committee to allow for the possibility, particularly in voluntary governance environments, of a strong board with a weak audit committee and vice versa. In addition, we do not investigate how differences between Singapore and the Western economies, in respect of culture and institutional factors such as legal protection and ownership structure, affect corporate governance and auditors' judgments.

Since the participants in our experiment are limited to audit managers from the Big 4 audit firms, our findings might not be generalisable to other staff levels and to non-Big 4 firms. Nevertheless, audit managers are frequently called to make client acceptance recommendations in practice, which likely influence audit partners' decisions. We hold the industry, financial condition and size of the hypothetical client constant for all three treatment conditions. Future research may explore how these

factors interact with corporate governance and affect auditors' judgments. Finally, we acknowledge that when auditors make client acceptance and planning judgments, they consider the potential billing rate, cost of the audit and the risk-return trade-off. These considerations are likely to vary across client characteristics such as size, financial condition, industry, public or non-public company, management reputation, and the risks of the specific accounting-cycle. While we control these factors by holding them constant across our experimental conditions, our results are limited to the extent such characteristics may influence auditors' judgments. Further research could consider the economic impact of these client characteristics and corporate governance on audit judgments.

References

Abbott, L. J., Parker. S. and Peters, G. F. (2004). 'Audit committee characteristics and restatements'. *Auditing: A Journal of Practice and Theory*, 23(1): 69–88.

Beasley, M. S. (1996). 'An empirical analysis of the relation between the board of director composition and financial statement fraud'. *The Accounting Review*, 71(5): 443–465.

Beasley, M. S., Carcello, J. and Hermanson, D. (1999). *Fraudulent Financial Reporting: 1987–1997. An Analysis of US Public Companies*. NY: Committee of Sponsoring Organizations of the Treadway Commission.

Bedard, J. C., Mock, T. and Wright, A. (1999). 'Evidential planning in auditing: a review of the empirical research'. *Journal of Accounting Literature*, 18: 96–142.

Bedard, J. C., and Johnstone, K. M. (2004). 'Earnings manipulation risk, corporate governance risk, and auditors' planning and pricing decisions'. *The Accounting Review*, 79(2): 277–304.

Bell, T. B., Marrs, F. O., Solomon, I. and Thomas, H. (1997). *Auditing Organizations Through a Strategic-Systems Lens*. NY: KPMG Peat Marwick LLP.

Bell, T. B., Landsman, W. R. and Shackelford, D. A. (2001). 'Auditors' perceived business risk and audit fees: analysis and evidence'. *Journal of Accounting Research*, 39(1): 35–43.

Carcello, J. V. and Neal, T. L. (2000). 'Audit committee composition and auditor reporting'. *The Accounting Review*, 75 (5): 453–467.

Carcello, J. V. and Neal, T. L. (2003). 'Audit committee characteristics and auditor dismissals following "new" going-concern reports'. *The Accounting Review*, 78(1): 95–117.

Carcello, J. V., Hermanson, D. R., Neal, T. L. and Riley Jr, R. A. (2002). 'Board characteristics and audit fees'. *Contemporary Accounting Research*, 19(3): 365–380.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, J. R. and Hanno, D. M. (2000). 'Auditors' consideration of corporate governance and management control philosophy in preplanning and planning judgments'. *Auditing: A Journal of Practice and Theory*, 19(2): 133–146.

Cohen, J. R., Krishnamoorthy, G. and Wright, A. M. (2002). 'Corporate governance and the audit process'. *Contemporary Accounting Research*, 19(4): 573–594.

Cohen, J. R., Krishnamoorthy, G. and Wright, A. M. (2004).

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[20] We thank a reviewer for this suggestion.

'The corporate governance mosaic and financial reporting quality'. *Journal of Accounting Literature*, 23: 87–152.

Cohen, J., Wright, A. and G. Krishnamoorthy. (2007). 'The impact of roles of the board on auditors' risk assessments and program planning judgments'. *Auditing: A Journal of Practice & Theory*, 26(1): 91–112.

COSO. (1992). *Internal Control – Integrated Framework.* Committee of Sponsoring Organizations of the Treadway Commission, NJ: AICPA.

Dechow, P., Sloan, R. and Sweeney, A. (1996). 'Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC'. *Contemporary Accounting Research*, 13(2): 1–26.

DeFond, M. and Francis, J. (2005). 'Audit research after Sarbanes-Oxley'. *Auditing: A Journal of Practice and Theory*, 24(Supplement): 5–30.

Fama, E. F. (1980). 'Agency problems and the theory of the firm'. *Journal of Political Economy*, 88(2): 288–307.

Fama, E. F. and Jensen, M. C. (1983). 'Separation of ownership and control'. *Journal of Law and Economics*, 26(2): 301–325.

Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1995). Multivariate Data Analysis. NJ: Prentice Hall Inc.

Hillman, A. J. and T. Dalziel. (2003). 'Boards of directors and firm performance: integrating agency and resource dependence perspectives'. *Academy of Management Review*, 28(3): 383–396.

Johnstone, K. M. (2000). 'Client acceptance decisions: simultaneous effects of client business risk, audit risk, auditor business risk, and risk adaptation'. *Auditing: A Journal of Practice and Theory*, 19(1): 1–27.

Johnstone, K. M., and Bedard, J. C. (2001). 'Engagement planning, bid pricing, and client response in the market for initial attest engagements'. *The Accounting Review*, 76(2): 199–220.

Johnstone, K. M., and Bedard, J. C. (2003). 'Risk management in client acceptance decisions'. *The Accounting Review*, 78(5): 1003–1025.

Klein, A. (2002). 'Audit committee, board of director characteristics' and earnings management'. *Journal of*

Accounting and Economics: 33(3): 375–400.

Maletta, M. and Kida, T. (1993). 'The effect of risk factors on auditors' configural information processing'. *The Accounting Review*, 68(1): 681–691.

McNair, C. J. (1991). 'Proper compromises: the management control dilemma in public accounting and its impact on auditor behavior'. *Accounting, Organizations and Society*, 16(7): 635–653.

Messier, W. and Austen, L. (2000). 'Inherent risk and control risk assessments: evidence on the effect of pervasive and specific factors'. *Auditing: A Journal of Practice and Theory*, 19(2): 119–131.

Messier, W. and Plumlee, D. (1987). 'The effects of anticipation and frequency of errors on auditors' selection of substantive procedures'. *Accounting and Business Research*, 17(68): 349–358.

Mock, T. J. and Wright, A. (1993). 'An exploratory study of auditors' evidential planning judgments'. *Auditing: A Journal of Practice and Theory*, 12(2): 39–61.

Pfeffer, J. (1972). 'Size and composition of corporate boards of directors: the organization and its environment'. *Administrative Science Quarterly*, 17(2): 218–229.

Pfeffer, J. and Salancik, G. (1978). *The External Control of Organizations: A Resource Dependence Perspective.* NY: Harper and Row.

Sarbanes-Oxley Act. (2002). One Hundred Seventh Congress of the United States of America, Second Session.

Sharma, D. S. (2006). 'Effects of professional and non-professional investors' perceptions of board effectiveness on their judgments: an experimental study'. *Journal of Accounting and Public Policy*, 25(1): 91–115.

The Code of Corporate Governance. (2001). Council on Corporate Disclosure and Governance. Singapore.

The Combined Code. (2006). *The Combined Code on Corporate Governance*. UK: Financial Reporting Council.

Zimbelman, M. F. (1997). 'The effects of SAS No. 82 on auditors' attention to fraud risk factors and audit planning decisions'. *Journal of Accounting Research*, 35 (Supplement): 75–97.

Fairness of performance evaluation procedures and job satisfaction: the role of outcome-based and non-outcome-based effects

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Abstract—Prior management accounting studies on fairness perceptions have overlooked two important issues. First, no prior management accounting studies have investigated how procedural fairness, by itself, affects managers' job satisfaction. Second, management accounting researchers have not demonstrated how conflicting theories on procedural fairness can be integrated and explained in a coherent manner. Our model proposes that fairness of procedures for performance evaluation affects job satisfaction through two distinct processes. The first is outcome-based through fairness of outcomes (distributive fairness). The second is non-outcome-based through trust in superior and organisational commitment. Based on a sample of 110 managers, the results indicate that while procedural fairness perceptions affect job satisfaction through both processes, the non-outcome-based process is much stronger than the outcome-based process. These results may be used to develop a unified theory on procedural fairness effects.

Keywords: fairness; performance evaluation procedures; trust; commitment; satisfaction

1. Introduction

Considering the importance and pervasiveness of performance evaluation procedures (processes) in organisational control systems, it is likely that the fairness of such procedures will have important behavioural implications for organisational members. This study therefore investigates if and how the fairness of procedures employed by organisations to evaluate their employees' performance and determine compensation affects employee job satisfaction.

Figure 1 presents the conceptual model underlying our study. It proposes that the effect of fairness of performance evaluation procedures (procedural fairness) on job satisfaction is indirect through two distinct processes. The first process is outcome-based through fairness of outcomes (distributive fairness) (path 1-2-5). The second process is non-outcome-based through trust in the superior (path 1-3-5) and organisational commitment (path 1-4-5).

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Procedures for performance evaluation are selected for investigation because the design of management accounting controls, including appropriate performance evaluation and compensation arrangements, is a crucial management function to promote positive employee attitudes and behaviours (Horngren el al., 2006; Merchant and van der Stede, 2007). Performance evaluation is also an important management accounting research area (Brownell and Dunk, 1991; Lau et al., 1995; Hartmann, 2000). Not surprisingly therefore, the systematic evaluation of fairness perception in the management accounting context was first undertaken by Hopwood (1972) in his study of performance evaluation methods. He and Otley (1978) both studied the effects of performance evaluative style on fairness perceptions. Subsequent studies (e.g. Lindquist, 1995; Magner and Johnson, 1995; Lau and Lim, 2002; Staley and Magner, 2006) have also investigated fairness-related issues in the management accounting context.

Several important conclusions could be drawn from prior studies. First, early studies on procedural fairness in a legal setting have found procedural fairness to be related to distributive fairness (e.g. Thibaut and Walker, 1975, 1978). Distributive fairness or fairness of outcomes may be defined as the judgments on how fair are the decisions that are made (Folger and Konovsky, 1989: 115; Greenberg and Folger, 1983: 236). A study by McFarlin and Sweeney (1992) found that distributive fairness, in turn, influences job satisfaction.

Figure 1
Relationship between fairness of procedures and job satisfaction
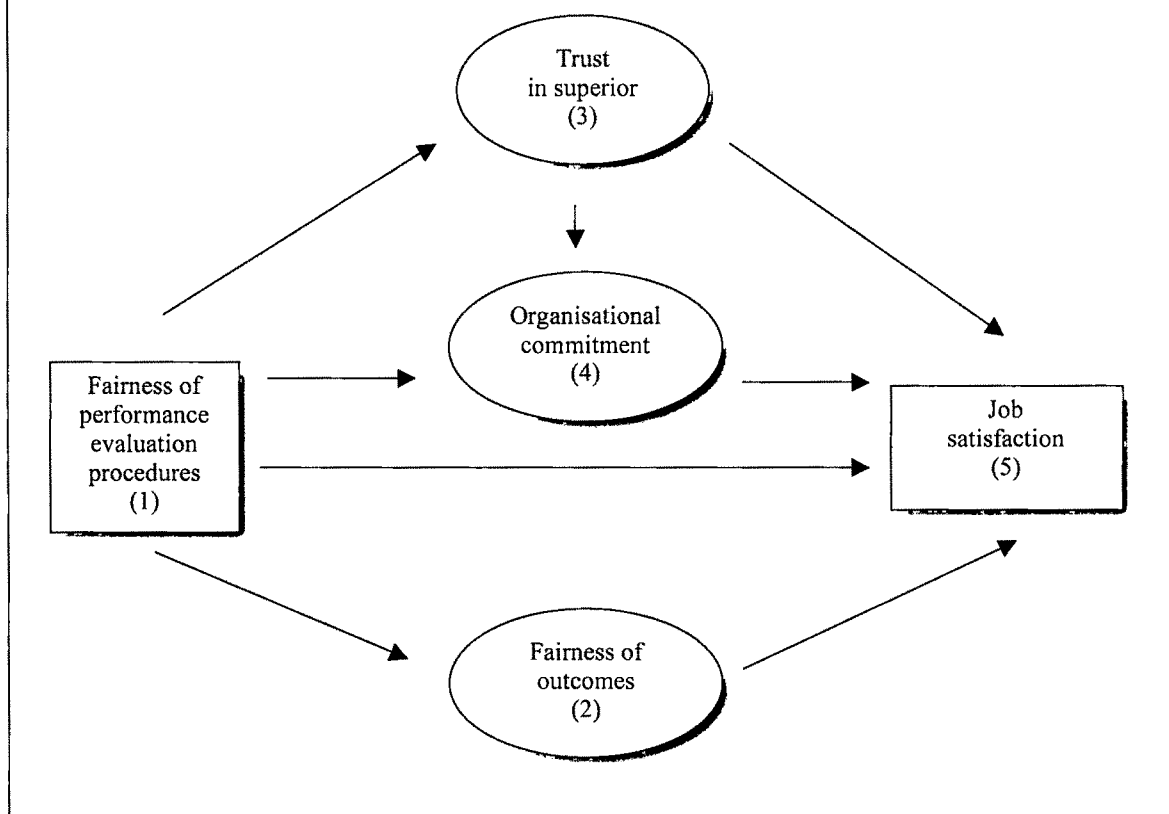
These findings suggest that the effects of procedural fairness on employee job satisfaction may be indirect through distributive fairness. Yet, to date, these likely indirect relationships of procedural fairness on job satisfaction through distributive fairness (path 1-2-5 in Figure 1) have not been systematically investigated.

The indirect effects of procedural fairness on job satisfaction through non-outcome-based or emotional processes are also yet to be investigated. Prior studies have found that procedural fairness has important emotional effects. Specifically, several studies have found a significant relationship between procedural fairness and employee trust in management or supervisor (e.g. Konovsky and Pugh, 1994; Magner and Johnson, 1995; Staley and Magner, 2006). A link was also found between procedural fairness and organisational commitment (Folger and Konovosky, 1989). Since these psychological effects (trust and organisational commitment) may be related to employee job satisfaction, it is likely that the relationship between procedural fairness and employee job satisfaction is indirect via (1) trust and (2) organisational commitment (see path 1-3-5 and path 1-4-5 in Figure 1).

The above discussion suggests that procedural fairness may be related to several outcome and non-outcome variables. Our study attempts to con-

tribute to the literature by the development of a model which integrates the two important processes by which fairness of employee evaluation procedures affects employee behaviours. The development of such a model is beneficial. First, it may minimise the confusion arising from the interpretation of several bivariate relationships, each studied in isolation. Instead, an integrated model may help us to understand how and where the various bivariate relationships found in prior studies fit and are linked together. Second, it may clarify whether the total effects between procedural fairness on job satisfaction are direct (as suggested by bivariate analysis) or indirect. More importantly, to date, no study has investigated systematically, with an integrated model, the two likely processes. An integrated model will facilitate the two distinct processes to be studied simultaneously allowing us to distinguish between (1) the outcome-based effects through distributive fairness, and (2) the non-outcome-based effects through trust and commitment.

Our study also differs from prior studies in terms of the variables incorporated in the models. Specifically, our model investigates the important psychological effects of procedural fairness through organisational commitment on job satisfaction. While commitment was studied by

Wentzel (2002), her interest was in goal commitment and not organisational commitment. Similarly, while satisfaction was studied by Lindquist (1995), his interest was in task satisfaction rather than overall job satisfaction. Hence, the complex relationships among procedural fairness, organisational commitment and overall job satisfaction in general and, more importantly, the process by which procedural fairness affects job satisfaction through organisational commitment, are yet to be systematically evaluated in a coherent manner. In the next section, relevant studies are examined to develop a theoretical basis for the hypotheses to be tested. Subsequent sections respectively describe the method, results and the implications for theory and practice.

2. Hypotheses development

2.1. Concept of procedural fairness (justice)

Lind and Tyler (1988: 3, 216) conceptualise procedural fairness as the judgments on how fair are those social norms which deal with 'how decisions are made' and 'how people are treated by authorities and other parties'. This concept is broader than earlier concepts which essentially suggest that the determinant of high procedural fairness is process control (participation) by those affected by the decisions and the consequence is the achievement of equitable outcomes (Thibaut and Walker, 1975). Lind and Tyler's broader concept includes other determinants and other consequences of procedural fairness. These other determinants include consistency, bias suppression, accuracy of information, correctability and ethicality (Leventhal, 1980). Other consequences include those emotional effects which are over and above the achievement of fair outcomes. Because this broad concept encompasses both outcome-based and non-outcome-based effects, two distinct theories are needed to explain its effects. Hence, the self-interest model (Lind and Tyler, 1988: 222) can explain those effects which are outcome-based and attributable to the use of fair procedures strictly for the purpose of achieving fair outcomes. In contrast, the group value model (Lind and Tyler, 1988) is used to explain those emotional effects which are over and above those attributable to the achievement of fair outcomes. These effects include those positive attitudes an individual harbours towards the group (organisation) and the leaders of the group arising from group procedures which enhance the individual's 'dignity as a full-status member of the group'(Lind and Tyler, 1988: 237).

2.2. Fairness of performance evaluation procedures and job satisfaction (path 1-5)

In this study, job satisfaction is selected as the dependent variable. The study of job satisfaction is important. Lind and Tyler (1988: 176–177) found that satisfaction is one of the principal consequences of procedural fairness. They concluded that 'the great practical value of procedural justice lies in ... its value as a source of ... satisfaction'. Hartmann (2000) has also considered job satisfaction a more appropriate dependent variable than managerial performance in studies on performance evaluation. According to him, prior studies on performance evaluation systems have consistently relied on role theory to explain the relationships between evaluation systems and employee behavioural outcomes. Role theory involves role conflict and role ambiguity and these variables 'typically point to such interpersonal and work-related factors as ... job satisfaction' (Hartmann, 2000: 467) and not on job performance.

The study of job satisfaction is also important in its own right. Locke (1976: 1297) defines job satisfaction as 'a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences'. Harrison (1992: 8) regards job satisfaction 'as leading to organisationally important outcomes including absenteeism and turnover, motivation, job involvement and performance'. Employees' satisfaction or dissatisfaction with their jobs can have multiple and serious consequences. Dissatisfied employees are more likely to engage in such actions as job avoidance and withdrawal, aggressions, defiance, protest, and psychological defensiveness. Additionally, employees' happiness is an important aspect of employee well-being. It is therefore not surprising that job satisfaction is a major behavioural outcome in management accounting research (e.g. Chenhall and Brownell, 1988; Frucot and Shearon, 1991; Harrison, 1992).

Fairness perceptions, including those arising from the use of different methods to evaluate employee performance, are an important research area. Both Hopwood (1972) and Otley (1978) hypothesise that performance evaluative methods affect employees' perceptions of fairness. For instance, Hopwood (1972: 174) considers performance evaluations based on an inflexible use of accounting data as a 'biased indicator of managerial performance ... (and) potentially inequitable'. His results indicate that the performance evaluation methods affect justness of evaluation which, in turn, affects employee satisfaction.

Several management accounting studies have linked performance evaluation procedures to job satisfaction (e.g. Brownell, 1982; Harrison, 1992; Lau and Sholihin, 2005). The justification is based on the premise that performance evaluation and the compensation employees receive are a reflection of the extent of employees' success or failure in performing their tasks. Feelings of success and failure are important determinants of job satisfaction (Locke and Latham, 1990: 237–238).

Based on the above discussion, it is reasonable to conclude that fairness of performance procedures may affect job satisfaction. However, these effects are likely to be indirect through two distinct processes including (1) fairness of outcomes (distributive fairness), and (2) trust in the superior and organisational commitment. The following sections provide the theoretical justification for these propositions.

2.3. Intervening effect of fairness of outcomes (path 1-2 and path 2-5)

Lind and Tyler (1988) conceptualise fairness of outcomes (distributive fairness) as the judgments on how fair are those norms which deal with the outcomes people receive. Tang and Sarsfield-Baldwin (1996: 25) suggest that 'distributive justice deals with the ends achieved (what the decisions are)'. Concepts of distributive fairness are based on the principle of equity when the outcome an individual receives is proportional to the individual's contribution. Adams (1965) suggests that because equity is such a fundamental norm, individuals will experience inequity distress when the allocation of outcomes among group members is not proportional to contribution. Perception of distributive fairness is therefore aroused not by absolute outcomes, but by a comparison of the proportion allocated to an individual relative to the proportion allocated to other group members. The theory of relative deprivation (Merton and Rossi, 1957) similarly suggests that individuals judge their situation not in absolute terms, but by comparing them to the situation of others. Individuals who receive favourable outcomes in objective terms may still be discontented if they perceive others are better rewarded. Hence, concepts of fairness of outcomes are relative concepts. The relative concept of fairness of outcomes is therefore used in our study.

Fairness of performance evaluation procedures may be associated with fairness of outcomes (Lindquist, 1995) (path 1-2). The instrumental theory of procedural fairness (Thibaut and Walker, 1975; Lind and Tyler, 1988) proposes that fairness of procedures may lead to fairer decisions (outcomes). Greenberg and Folger (1983: 236) explain as follows: 'If the process is perceived as being fair, then there is a greater likelihood that the outcomes resulting from that process will be considered fair. The tendency for ... procedural justice to influence ... distributive justice ... has been called the fair process effect.'

The self-interest model proposes similar effects (Lind and Tyler, 1988). This model theorises that the effects of procedural fairness on satisfaction are likely to be through its ability to generate fair outcomes. It proposes that because of self-interest, people are interested in getting the best outcomes.

They also perceive that in the long run, they may be better off with social intercourse. However, with such social intercourse, they may have to sacrifice their short-term gains in order to accommodate the self-interests of other members. How can they be assured that they will get their long-term gains? The model proposes that they will react more positively to fair procedures on the expectation that such fair procedures are more likely to deliver the long-term gains they desire. The consequence of receiving fair outcome is likely to be higher satisfaction. Greenberg and Folger (1983: 239) succinctly suggested that fair procedures are likely to let 'people get what they want. Certainly it should be no great surprise that people who get what they want are happier.'

Based on the above discussion, it is reasonable to conclude that fairness of the evaluation procedures is likely to lead to fairer performance evaluations and more equitable compensation for the subordinates (path 1-2). Subordinates who receive fair evaluations and fair compensation are likely to be more satisfied (path 2-5). Accordingly, we propose that:

H1a Fairness of performance evaluation procedures is positively related to fairness of outcomes (distributive fairness) (path 1-2).

H1b Fairness of outcomes is positively related to job satisfaction (path 2-5).

If H1a and H1b are both supported, they would support the expectation that the effect of procedural fairness on job satisfaction is indirect through fairness of outcomes. Hence, we also propose that:

H1c Fairness of performance evaluation procedures has an indirect effect on job satisfaction through fairness of outcomes (path 1-2-5).

2.4. Intervening effects of trust and organisational commitment

The relationship between fairness of performance evaluation procedures and job satisfaction may involve other considerations that lie below the superficial simplicity of hypotheses H1a, H1b and H1c. Lind and Tyler (1988) suggest that the effects of procedural fairness may be non-instrumental. These effects are those which are over and above the outcome-based effects. They occur regardless of whether the subordinates ultimately receive fair rewards for their effort.

The group value model of Lind and Tyler (1988) proposes that organisational (group) procedures which treat members fairly engender positive organisational outcomes, not because such procedures lead to fair outcomes but because of the importance people attach to group identification and affiliation. This model suggests that people,

who by nature are affiliate creatures, value group membership *per se*. Hence, fairness in the way people are treated by their groups is important because it is perceived as 'a visible marker of group membership' and provides the recipient the 'dignity as a full-status member of the group' (Lind and Tyler, 1988: 236–237). Fairness of procedures may therefore enhance job satisfaction, not merely because it leads to fairer outcomes but because it may engender positive outcomes associated with group membership, including trust in superior and organisational commitment.

2.5. Fairness of performance evaluation procedures and trust in superior (path 1-3)

Fairness of performance evaluation procedures is likely to enhance the subordinates' trust in their superiors (Hopwood, 1972; Otley, 1978; Magner and Welker, 1994; Magner et al., 1995). Rousseau et al. (1998: 395) define trust as 'a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another.' Management accounting procedures are designed, implemented and enforced by organisations through their senior management. Hence, subordinates are likely to attribute the fairness of procedures to their superiors. If the procedures used are perceived as fair, the subordinates are likely to have favourable impressions of their superiors. Accordingly, they are likely to perceive their superiors as trustworthy.

Additionally, performance evaluation procedures may be perceived as fair if they conform to fairness rules. Based on theoretical reasoning, Leventhal (1980) develops several fairness rules. Those that are supported by empirical investigations include consistency, accuracy of information, representativeness and ethicality (Barrett-Howard and Lamm, 1986; Barrett-Howard and Tyler, 1986). Consistency refers to the consistent application of procedures. Procedures are also perceived as fair if decisions are based on accurate information. Representativeness suggests that the concerns, values and outlook of the subordinates are taken into consideration by the superiors. Finally, ethicality reflects that decisions conform to standards of ethics and morality. Procedures which conform to these fairness criteria are likely to engender favourable employee reactions. Consequently, superiors who implement fair procedures are likely to elicit trust from their subordinates. Accordingly, we propose that:

H2a Fairness of performance evaluation procedures is positively related to the subordinates' trust in their superiors (path 1-3).

2.6. Trust and job satisfaction (path 3-5)

Trust in superiors is likely to be associated with job satisfaction. It is likely to affect the confidence the subordinates have in their superiors' motives and intentions with respect to matters relevant to their careers and status in the organisation (Read, 1962). If they believe that their superiors are likely to take advantage of opportunities that arise to further their (the subordinates') interests, they are likely to trust their superiors. This may lead to more congenial working relationships which, in turn, may be associated with higher job satisfaction. Moreover, trust is likely to be associated with an environment in which there is much communication between the subordinates and their superiors. In high trust environments, the superiors are likely to be more transparent and more willing to keep their subordinates fully informed about matters of concern to them. The subordinates are also likely to feel free to discuss with their superiors problems and difficulties encountered in task completion, without fear that their careers could be jeopardised. This increased communication may lead to higher job satisfaction.

In contrast, in low trust environments, both the subordinates and their superiors are likely to be less open. Superiors may be secretive and less transparent. Similarly, subordinates may learn that it may be unwise to open up to their superiors. Such a strained working relationship is likely to lead to low job satisfaction. Accordingly, we propose that:

H2b Trust in superiors is positively related to job satisfaction (path 3-5).

If H2a and H2b are both supported, they would support the expectation that the effect of fairness of evaluation procedures on job satisfaction is indirect through the trust. Accordingly, we propose the following:

H2c Fairness of performance evaluation procedures has an indirect effect on the job satisfaction through trust in superiors (path 1-3-5).

2.7. Fairness of procedures and organisational commitment (path 1-4)

Organisational commitment comprises three components including continuance, normative (moral) and affective commitment. Allen and Meyer (1990: 3) suggest that 'employees with strong affective commitment remain because they want to, those with strong continuance commitment because they need to, and those with strong normative commitment because they feel they ought to do so.' Porter et al. (1974: 604) define affective organisational commitment as 'the strength of an individual's identification with and involvement in a particular organisation ... characterised by ... (a) a strong belief in and acceptance of the organisation's goals and values; (b) a willingness to exert considerable effort on behalf of the organ-

isation; and (c) a definite desire to maintain organisational membership.' Almost all prior management accounting studies involving organisational commitment have adopted this concept of affective organisational commitment (e.g. Magner and Welker, 1994; Magner et al. 1995; Nouri and Parker, 1998). Consequently, it is also used in our study.

Fairness of evaluation procedures is likely to be associated with organisational commitment (Hopwood, 1972; Folger and Konovsky, 1989; McFarlin and Sweeney, 1992; Magner and Welker, 1994; Magner et al., 1995). Employees are likely to react favourably to an organisation which employs fair procedures. Referent cognition theory suggests that subordinates evaluate their experience by reflecting on 'what might have been' under different situations (Folger, 1986; Lindquist, 1995; Magner et al., 1995). If they perceive their compensation as inadequate, but the organisation's procedures for the determination of performance and compensations as fair, they are not likely to blame their organisation for their inadequate compensation, since they will find it difficult to envision that more favourable alternative outcomes could have occurred, given that procedures are already fair (McFarlin and Sweeney, 1992). However, if they perceive their compensation as inadequate, and their organisation's procedures for the determination of performance and compensation as unfair, they are likely to reflect on what might have been, had the procedures been fair. Consequently, they may hold unfavourable views of their organisation and hence low organisational commitment. Based on the above discussion, we propose as follows:

H3a Fairness of evaluation procedures is positively related to organisational commitment (path 1-4).

2.8. Organisational commitment and job satisfaction (path 4-5)

Several researchers (e.g. Steer, 1977; Bateman and Strasser, 1984; DeCotiis and Summers, 1987) have argued that highly committed employees may experience higher job satisfaction. Porter et al. (1974: 604) and Mowday et al. (1979: 226) both associate affective organisational commitment with three characteristics, namely, 'a strong belief in and acceptance of organisational goals; a willingness to exert considerable effort on behalf of the organisation and a definite desire to maintain organisational membership'. Since these are all work-related, it is likely that high affective commitment is associated with high job satisfaction.

Highly committed employees are likely to view organisational goals as important. Hence, they may exert effort to pursue these organisational goals without the need to be coerced. Under such

conditions, job satisfaction is likely to be high because the completion of tasks is associated with the achievement of organisational objectives, which gives satisfaction to highly committed subordinates. In contrast, subordinates with low organisational commitment are primarily concerned with pursuing self-interests. Whilst they may exert effort to complete their tasks, it is likely that they may do so because of pressure, coercion or fear of jeopardising their careers. This is unlikely to enhance their job satisfaction. Accordingly, we propose that:

H3b Organisational commitment is positively related to job satisfaction (path 4-5).

If H3a and H3b are both supported, they would support the expectation that the effects of fairness of evaluation procedures on job satisfaction are indirect through organisational commitment. Accordingly, we propose the following:

H3c Fairness of evaluation procedures has an indirect effect on job satisfaction through organisational commitment (path 1-4-5).

2.9. Trust and organisational commitment (path 3-4)

Trust in supervisors may be associated with organisational commitment. Organisations are represented by their management and act through them. The subordinates are therefore likely to perceive their organisation through the supervisors who are employed by the organisation to supervise them. Based on their analysis of the organisational commitment literature, Ketchand and Strawser (2001: 231) conclude that organisational commitment 'appears to be particularly influenced by situational factors, such as leader behaviors ... and the extent of leader communications'. Consequently, if the subordinates harbour positive (or negative) feelings toward their superiors, who are, after all, acting on behalf of the organisation, they (the subordinates) are also likely to harbour similar feelings toward their organisation. This suggests that a high level of trust in the superiors is likely to be translated into a favourable attitude towards the organisation. This may lead to the subordinates bonding with the organisation, and hence, high organisational commitment.

Affective commitment reflects an emotional attachment to the employing organisation. It will occur only when the work environment is conducive and harmonious. Allen and Meyer (1990: 8) suggest that the extent of the subordinates' feeling of comfort in their relationship with their organisation may influence affective commitment. The extent of the subordinates' comfort in this relationship, in turn, may be affected by variables such as whether the superiors are receptive to subordinates' suggestions, whether the subordinates

are treated equitably by the superiors and whether there is cohesion between the subordinates and their superiors. These conditions are likely to be determined by the level of interpersonal trust between the subordinates and their superiors. Hence, trust in the superior may be positively associated with organisational commitment. We therefore propose that:

H4   Trust in the superior is positively related to organisational commitment (path 3-4).

3. Method

Data were collected by a survey questionnaire. The sample was selected from employees in the health services sector and comprised all the 251 managers from the health services sector of an Australian state. While early studies on procedural fairness were concentrated mostly in legal and political settings, more recent research had found the effects of procedural fairness to be observable in any organisational settings (Leventhal, 1980). As employee performance evaluation is an integral aspect of the management control systems of work organisations, performance evaluation procedures are likely to be one of the most ubiquitous features of organisations. Employees in the health services sector are therefore just as likely to be subject to performance evaluation process as employees in other organisational settings. Hence, a sample drawn from the health services sector is as appropriate as any sample drawn from other sectors where employee performance evaluation occurs.

The names and addresses of managers were drawn from the Health Department Exchange E-mail Global Addresses.[1] A questionnaire was mailed to each of these 251 managers. Each questionnaire was accompanied by a covering letter, assuring the managers confidentiality of the data collected, and a prepaid reply-addressed envelope for the questionnaire to be returned directly to the researchers. A follow-up letter was sent to each of those managers who had not responded after three weeks of the initial mailing out of the questionnaire.

Six questionnaires were returned unopened and were removed from the sample. Of the remaining sample of 245, a total of 112 were returned. Two of these were not usable, as the focal variables were not fully completed. This left the study with 110 usable responses which constitutes a response rate of 45%. In order to test for non-response bias, the procedures suggested by Oppenheim (1992) were used. These involved splitting the sample into two halves. T-tests were undertaken for the variables studied to ascertain if there were any significant

differences between the responses from the first half of the sample (earlier responses) and those from the second half of the sample (later responses). Oppenheim (1992) suggests that if later responses differ significantly from earlier ones, non-response bias may be present. The lack of significant differences found for any of the variables in this study suggests the absence of a response bias.

The mean age of the respondents was 47.9 years. The respondents had held their current positions for an average of 5.8 years and had 12.8 years of experience in their area of responsibility. They were responsible for an average of 59 employees. Seventy-eight percent of them had either a tertiary or a professional qualification. These demographic data indicate that the respondents were generally highly qualified and experienced managers who held very responsible positions.

4. Measurement instruments

Fairness of performance evaluation procedures
We use the instrument devised by McFarlin and Sweeney (1992) to measure procedural fairness because it is designed expressly to measure employees' perceptions of the level of fairness of the procedures employed for determining their performance and compensation (Lau and Moser, 2008). It comprises four items which ask the respondents to rate the fairness of the procedures used in their organisations to evaluate employee performance, determine promotions, communicate performance feedback and determine pay increases. An overall fairness of procedures score for each respondent is ascertained by summing the scores of the four items. The factor loading results of a confirmatory factor analysis indicate that all items loaded above the 0.5 benchmark. A Cronbach alpha of 0.78 is obtained. This indicates satisfactory internal consistency for the items in the instrument.

Fairness of outcomes (distributive fairness)
Two existing instruments are available to measure fairness of outcome. The first was developed by Hopwood (1972) and was also used by Otley (1978). It comprises a single item which asks the respondent to rate 'How justly do you think your performance is evaluated?' The second is a five-item instrument developed by Price and Mueller (1981). This instrument asks respondents to rate the fairness of the rewards that they received taking into consideration the amount of effort that they had put forth, the responsibilities that they had, the stresses and strains of their jobs, the amount of education and training that they had and the work that they had done well. We use the instrument developed by Price and Mueller (1981) because its five items permit reliability tests to be

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[1] Permission was granted by the Health Services to use these e-mail addresses.

undertaken. The Cronbach alpha of 0.95 indicates high internal consistency. Satisfactory factor loading results of above 0.5 from a confirmatory factor analysis are found for the four items.

Trust in the superior

We use Read's (1962) four-item instrument to measure trust in the superior. The items ask each respondent to rate: (i) the extent to which the respondent's superior takes advantage of opportunities to further the respondent's interests; (ii) the extent to which the respondent feels free to discuss with the superior the problems and difficulties in the respondent's job without jeopardising the respondent's position; (iii) the confidence the respondent feels that the superior keeps the respondent fully and frankly informed; and (iv) the trust the respondent has that the superior's decisions are justified when the superior's decisions seem to be against the interests of the respondent. According to Read (1962: 8), these items are intended 'to reflect the manager's trust and confidence in the superior's motives and intentions with respect to matters relevant to the subordinate's career and status in the organisation.' Several prior management accounting studies have also used this instrument (e.g. Hopwood, 1972; Otley, 1978; Ross, 1994; Magner and Welker, 1994; Magner et al., 1995). The Cronbach alpha of 0.83 indicates high internal consistency for the instrument. Satisfactory factor analysis results with loading in excess of 0.5 are found for all items.

Organisational commitment.

The nine-item, seven-point Likert-scaled short-form version of the Organisational Commitment Questionnaire (OCQ) developed by Porter et al. (1974) is chosen to measure organisational commitment. Almost all prior management accounting studies involving organisational commitment have used this instrument (e.g. Magner and Welker, 1994; Magner et al. 1995; Nouri and Parker, 1998). Cohen (1993) finds an overwhelming majority of 29 out of the 36 investigations in 34 studies he reviewed relied on this instrument to measure organisational commitment. It has also been tested rigorously and successfully by Mowday et al. (1979) for its psychometric properties.

In our study, the Cronbach alpha for the seven items is 0.89 which provides support for high internal consistency. The factor loading results indicate that eight of the nine items have factor loadings equal to or in excess of 0.5. Only one item has a factor loading of 0.39 which is not too far below the 0.5 benchmark. Prior studies which relied on this instrument have generally used all the nine items to measure organisational commitment. Moreover, as the fit indices from the struc-

tural modeling analysis indicate acceptable model fit (to be discussed further in the Results section), we use all nine items to measure organisational commitment.

Job satisfaction

Job satisfaction is measured by the 20-item short form version of the Minnesota Satisfaction Questionnaire (MSQ). This instrument was developed by Weiss et al. (1967). A five-point scale anchored at '1' for 'Not satisfied' to '5' for 'Extremely satisfied' is used. The short-form version of the instrument, instead of the 100-item long-form version, is adopted to keep the questionnaire to a manageable length, since senior managers with time constraints may not be willing to respond to lengthy questionnaires.

As the 20 items for the job satisfaction are made up from 20 different job facets (e.g. satisfaction with superior, pay, chance of promotion, working conditions), a confirmatory factor analysis is not undertaken as these items are each already a separate subdimension of overall job satisfaction. As the subscales are the subdimensions of overall job satisfaction, the sum the scores of these subdimensions is an appropriate measure of employee overall job satisfaction. Hence, the overall job satisfaction score is derived by a summation of the 20 subscale scores. This summation approach is prevalent in the literature. Prior management accounting studies which adopt this instrument include Brownell (1982), Chenhall and Brownell (1988), Frucot and Shearon (1991) and Harrison (1992). All have adopted the summation approach to derive a composite score to represent overall job satisfaction. Descriptive statistics of the variables investigated in this study are presented in Table 1.

5. Results

Given the relationships of the theoretical model in Figure 1, the structural equation modeling (SEM) technique is used. We select it because, apart from its ability to model relationships among multiple predictors and criterion variables and construct unobservable latent variables, it is also able to evaluate the relative importance of the various direct and indirect links among variables and as such helps in the understanding of the causal mechanism among variables. We use *AMOS Version 7* for the analysis.

The structural model is undertaken with all the items in the questionnaire for each construct, as discussed in the Measurement Instruments section, except for the job satisfaction construct. For the job satisfaction construct, a single score comprising the sum of all 20 items for this construct is used for each respondent.

The results of the structural equation model provide a chi-square of 349 with 223 degrees of free-

Table 1
Descriptive statistics and Cronbach alphas

Variables	Mean	Std dev	Theoretical range		Actual range		Cronbach alpha
			Min	Max	Min	Max	
Fairness of procedures	13.23	2.88	4	20	6	20	0.78
Trust in superior	13.70	3.56	4	20	5	20	0.83
Organisational commitment	42.70	9.61	9	63	16	63	0.89
Fairness of outcomes	15.17	5.07	5	25	5	25	0.95
Job satisfaction	69.83	11.24	20	100	44	98	N/A

Table 2
Fit indices

Model	TLI	CFI	IFI	RMSEA
Default model	0.910	0.921	0.922	0.072
Independence model	0.000	0.000	0.000	0.240

dom, returning a probability value of less than 0.001. By convention, the chi-square test suggests that if the probability value (p) is less than 0.05, the null hypothesis that the model fits the data is rejected (Bacon, 1997). Since our result has a probability smaller than 0.05, it suggests that our model does not fit the data. However, as the chi-square test is an absolute test of model fit and is sensitive to sample size, the chi-square results may be attributed to our small sample size (Browne and Mels, 1994). Our sample size is only 112, which is considerably smaller than the recommended 200 to 400 cases needed for fitting model by chi-square statistics (Bacon, 1997). Moreover, the modification index values from the structural model are generally quite small with only one pair of residual covariances in excess of 0.5 at 0.533. There are also no indications of errors or warnings. These results suggest that it is safe for us to proceed to the relative fit statistics to ascertain the extent by which our theoretical model outperforms other baseline models. Table 2 indicates that the Tucker-Lewis Index (TLI or NNFI) is 0.91. The Comparative Fit Index (CFI) is 0.921 and the Incremental Fit Index (IFI or Delta2) is 0.922. By convention, for a model to be accepted, these baseline comparison fit indices should be equal or greater than 0.90 (Segars and Grover, 1993; Hartwick and Barki, 1994; Bentler, 1995). Since the indices for the theoretical model in our study are all in excess of 0.90, they indicate acceptable model fit. Table 2 also indicates that RMSEA is 0.072. By convention, there is adequate model fit

if RMSEA is less than or equal to 0.08 (Arbuckle, 2006). Based on these results, we use the standardised direct effects (path coefficients), the standardised indirect effects and the standardised total effects generated by the structural equation for hypotheses testing.

5.1. H1a, H1b, H2a, H2b, H3a, H3b and H4

Table 3 presents the zero order correlations between the variables investigated in this study. These results indicate that the correlation between fairness of procedures and job satisfaction is highly significant (r_{15}=0.377; p<0.01). Further analyses are needed to ascertain the nature of this significant effect.

H1a, H1b, H2a, H2b, H3a, H3b and H4 each predict a significant relationship between their respective two variables. The results in Table 3 indicate that the zero order correlation coefficients for all these relationships are highly significant. Specifically, the zero order correlations are significant for the relationships between (i) fairness of procedures and fairness of outcomes (r_{12}=0.418) for H1a; (ii) fairness of outcomes and job satisfaction (r_{25}=0.313) for H1b; (iii) fairness of procedures and trust in superior (r_{13}=0.259) for H2a; (iv) trust in superior and job satisfaction (r_{35}=0.533) for H2b; (v) fairness of procedures and organisational commitment (r_{14}=0.407) for H3a; (vi) organisational commitment and job satisfaction (r_{45}=0.543) for H3b; and (vii) trust in superior and organisational commitment (r_{34}=0.236) for H4. These hypotheses are therefore supported.

Table 3
Zero order correlations between variables

Relations		Zero order effect
Fairness of procedures(1)/Fairness of outcomes(2)	r_{12}	0.418***
Fairness of procedures(1)/Trust(3)	r_{13}	0.259***
Fairness of procedures(1)/Organisational commitment(4)	r_{14}	0.407***
Fairness of procedures(1)/Job satisfaction(5)	r_{15}	0.377***
Fairness of outcomes(2)/Trust(3)	r_{23}	0.107
Fairness of outcomes(2)/Organisational commitment(4)	r_{24}	0.257***
Fairness of outcomes(2)/Job satisfaction(5)	r_{25}	0.313***
Trust(3)/Organisational commitment(4)	r_{34}	0.236**
Trust(3)/Job satisfaction(5)	r_{35}	0.533***
Organisational commitment(4)/Job satisfaction(5)	r_{45}	0.543***

*** $p < 0.01$ (two-tailed)
** $p < 0.05$ (two-tailed)
* $p < 0.10$ (two-tailed)

5.2. H1c, H2c, H3c (indirect effects via fairness of outcomes, trust and organisational commitment)

H1c states that there is an indirect relationship between fairness of evaluation procedures and job satisfaction through fairness of outcomes (distributive fairness). H2c states that the indirect relationship is through trust. H3c states that the indirect relationship is through organisational commitment.

In order to ascertain whether each of the hypothesised intervening variables (fairness of outcomes, trust in superior and organisational commitment) mediates the relationship between fairness of evaluation procedures and job satisfaction, it is necessary to decompose the standardised total effect of the relationship between fairness of evaluation procedures and job satisfaction into (i) the standardised direct effect, and (ii) the standardised indirect effects. The standardised direct effects or path coefficients from the structural equation analysis by AMOS are presented in Table 4 and Figure 2.

Based on these path coefficient results in Figure 2, the indirect effects of fairness of procedures (FP)(1) on job satisfaction (JS)(5) through fairness of outcomes (FO)(2), trust (TR)(3) and organisational commitment (OC)(4) are ascertained as in Table 3a below.

Path (1-2-5) indicates that the indirect effect exclusively via fairness of outcomes is 0.062. Path (1-3-5) indicates that the indirect effect via trust is 0.165. Paths (1-4-5) and (1-3-4-5) indicate that the indirect effect through organisational commitment is 0.199 (0.182 + 0.017). An indirect effect in excess of an absolute amount of 0.05 may be considered meaningful (Bartol, 1983; Pedhazur, 1982). For this study, the indirect effects via fairness of outcomes (0.062), via trust (0.165) and via organisational commitment (0.199) are each in excess of 0.05. Moreover the combined indirect effect is 0.426 out of a total effect of 0.434. These results support the expectation that the effects of fairness of procedures on job satisfaction are almost entirely indirect rather than direct. Accordingly, H1c, H2c and H3c are supported.

6. Discussion and conclusion

Fairness is important in organisational settings. Hence, studies on the effects of the fairness of management accounting procedures employed for performance evaluation are needed to provide systematic empirical evidence to explain how the subordinates' perceptions of the fairness of such procedures affect their behaviours and attitudes (Hopwood, 1972; Magner et al., 1995; Horngren

Table 3a
Indirect effects

Path (1-2-5)	FP – FO – JS	0.445×0.139	0.062
Path (1-3-5)	FP – TR– JS	0.370×0.445	0.165
Path (1-4-5)	FP – OC – JS	0.431×0.424	0.182
Path (1-3-4-5)	FP – TR – OC– JS	$0.370 \times 0.108 \times 0.424$	0.017
Total indirect effect			0.426

Table 4
Standardised direct, indirect and total effects

Independent variables	Dependent variables	Direct effects	Indirect effects	Total effects
Fairness of procedures	Fairness of outcomes	0.445	–	0.445
Fairness of procedures	Trust	0.370	–	0.370
Fairness of procedures	Commitment	0.431	0.040	0.471
Trust		0.108	–	0.108
Fairness of procedures	Job satisfaction	0.008	0.426	0.434
Trust		0.445	0.046	0.491
Commitment		0.424	–	0.424
Fairness of outcomes		0.139	–	0.139

Figure 2
Path coefficients
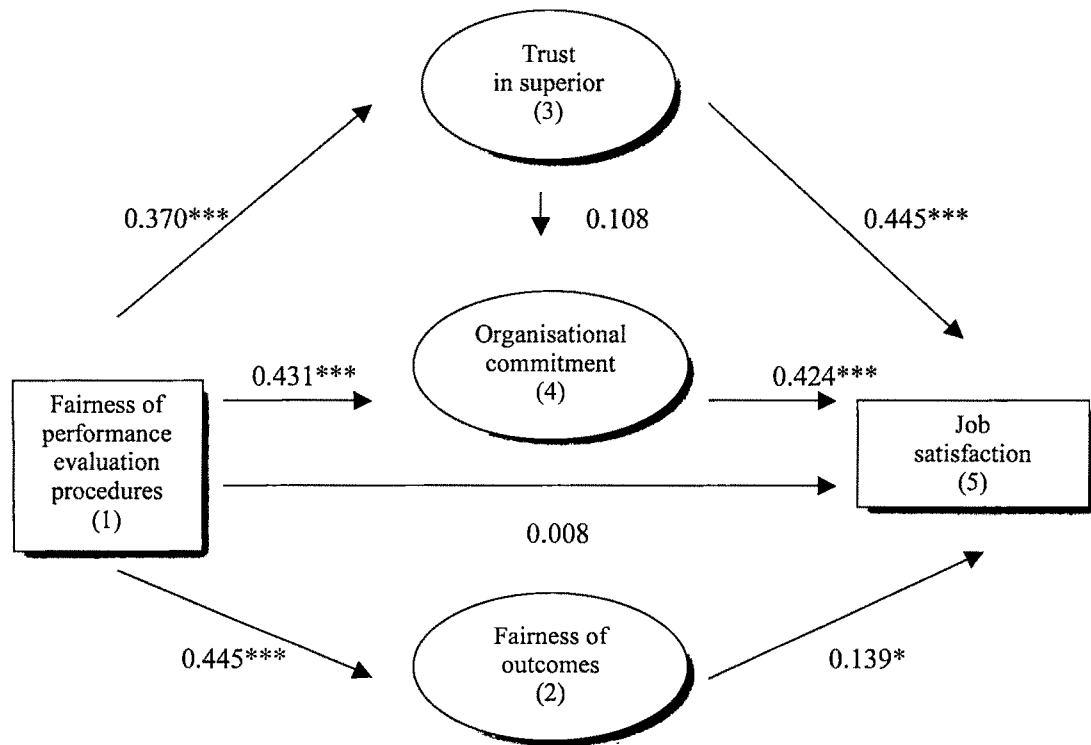
*** p< 0.01 (two-tailed)
**   p< 0.05 (two-tailed)
*   p< 0.10 (two-tailed)

et al., 2006). Our study therefore investigates whether fairness of performance evaluation procedures affects job satisfaction; and if it does, the different cognitive and emotional processes by which it affects job satisfaction.

Our results indicate that fairness of performance evaluation procedures has a significant total effect on subordinates' job satisfaction. However, they also indicate that the direct effect (0.008) is very small. The total effects are mainly indirect. Part of the indirect effect is through the expected fairness of the outcomes (e.g. compensation and rewards) received by the subordinates. These results are not surprising as fair procedures are expected to be associated with fair outcomes which, in turn, are associated with improved job satisfaction. However, what is surprising is the relative small size of this effect, which is only 0.062 out of a total indirect effect of 0.434. Most of the indirect effect is through trust in superior (0.165) and organisational commitment (0.199).

These results are important for theory development. They provide the empirical evidence to support theories including those by Thibaut and Walker (1978), Leventhal (1980) and the self-interest model of Lind and Tyler (1988). These theories all suggest that procedural fairness effects occur mainly because of the fair outcomes that fair procedures engender. However, because the relative size of the indirect effect through this process is small, our results indicate that this process may be much less important than these theories suggest. As our sample was drawn from managerial level employees from the health services sector, the extent to which the nature of this sample may have influenced the results is unclear. Hence, generalising the results to other levels of employees and to other sectors should be undertaken with caution.

In contrast to the outcome-based effects, our results indicate that the non-outcome-based effects (through trust and organisational commitment) are surprisingly very strong. These results provide strong support for the non-outcome-based models such as the group value model (Lind and Tyler, 1988). This model is based on the premise that 'because procedures are very important aspects of the perceptions of groups, evaluation of procedures, in the form of procedural justice judgments, would be expected to have strong effects on other group relevant attitudes ... (and) hardly surprising, then, that procedural justice judgments affect evaluations of leaders and institutions.' Our results are consistent with these observations. They indicate that (1) evaluation of leaders, as measured by the extent of trust in the superior, and (2) evaluation of the institutions, as measured by the level of organisational commitment, are both important effects through which procedural fairness affects satisfaction.

From a theory development perspective, these results may help to explain why apparently different theories of procedural fairness effects, such as the self-interest model and the group value model can each sometime find support in empirical studies, but each is, by itself, unable to explain all procedural fairness effects. Lind and Tyler (1988: 240) suggest that their two models encounter difficulty in explaining all procedural fairness effects because 'just as the self-interest model has difficulty explaining why such (outcome-based) effects are not as powerful than they are, the group value model, because it makes no reference to outcomes, has difficulty explaining why such effects should occur at all.' (Parenthesis added). Recall that the self-interest model suggests that people perceive procedures solely as instruments for generating equitable outcomes. Lind and Tyler (1988: 226) suggest that for this theory to hold, 'the production of fair outcomes is ... what is meant by fair procedures'. This means that the self-interest theory is able to explain the results of studies where the effects of procedural fairness are attributed to the generation of fair outcomes (e.g. Thibaut and Walker, 1978; Brett, 1986). It is, however, unable to explain the effects of those studies which found effects which are independent of outcomes (e.g. Earley, 1984; Paese, 1985).

Similarly, relying on only the group value model to explain all the effects of procedural fairness is inadequate. This model suggests that people value group membership. Procedures which reinforce their group relationships, for instance, with their superiors and their organisations, are perceived as fair regardless of whether these procedures generate favourable outcomes. Hence, this model is able to explain the results of Earley (1984) and Paese (1985). However, because this model does not consider the importance of outcomes, it is unable to explain why the significant relationships between procedural fairness and fairness of outcomes found in studies such as Thibaut and Walker (1978) and Brett (1986).

Our study suggests that the dilemma posed by the need to use different theories to explain procedural fairness effects is surmountable. These different theories are not invalid. Each is simply incomplete by itself. The use of a comprehensive model which incorporates both (1) the outcome-based effects through distributive fairness, and (2) the non-outcome-based effects through trust and organisational commitment, may minimise confusion. Our results indicate that, studied together within a single model, the two theories provide good explanations of most procedural fairness effects.

Our findings may have important implications for management accounting practices. We select procedures for performance evaluation and com-

pensation arrangements for investigation because they are major aspects of management control systems. Employees are concerned with performance evaluations because of the close link between performance evaluations and the compensation they receive. Horngren et al. (2006: 845) regard performance evaluation and employees' compensation as intricately linked and conclude that 'many management accounting practices ... have as their goal better performance evaluation.' Kaplan and Atkinson (1998: 676) similarly regard performance evaluation and the design of compensation arrangements as crucial management accounting functions because 'compensation contracts, particularly incentives and bonus plans, provide important direction and motivation for corporate executives.' Hence, findings on employee reactions to performance evaluation procedures are relevant to management accountants who play crucial roles in the design of these procedures.

While our results are based on a sample from the health services sector, they may be generalisable to other sectors. Procedural fairness reactions occur because of the way people are treated by others. Their reactions generally reflect the way they would like to be treated in social interactions, namely, with respect and dignity (Messick et al., 1985; Mikula, 1986; Greenberg, 1993). Such reactions are more likely to be universal than being unique to specific contexts. Our findings and explanations may have wider implications for management accounting practices than only in the health sector.

Even though support was found for the hypotheses developed for this study, it may have a number of limitations. First, our study is based on survey data. While the survey method is a well-documented research method and has the advantage of capturing naturally occurring phenomena with responses from real managers in a real world setting, it is unable to manipulate variables. Opportunities therefore exist for future research to retest our model with experiments to ascertain whether our results based on the real world setting could be replicated in controlled laboratory conditions.

Second, we have hypothesised that it is organisational commitment which influences job satisfaction. However, the literature suggests that the causal ordering of organisational commitment and job satisfaction is equivocal. While some researchers (e.g. Steer, 1977; Bateman and Strasser, 1984; DeCotiis and Summers, 1987) argue that it is organisational commitment which influences job satisfaction, other studies (e.g. Price and Mueller, 1981; Locke and Latham, 1990) suggest that it is job satisfaction which influences organisational commitment. Other theoretical models may also be possible. For instance, organisational commitment could be the most important situa-

tional variable. Similarly, trust may be viewed as a moderating variable. Hence, opportunities exist for future research to collect a bigger sample, include additional constructs and employ different research methods to investigate if these alternative theoretical models could be supported. For instance, the use of a longitudinal analysis may be helpful in resolving the controversy regarding the causal ordering of the various constructs (e.g. organisational commitment vis-à-vis job satisfaction).

Lastly, our study has focused on job satisfaction. While this is an important dependent variable in the study of procedural fairness effects (Lind and Tyler, 1988), employee performance is also important and a practical concern for organisations. Future research could therefore investigate the processes by which procedural fairness affects employee performance. According to Lind and Tyler (1988: 188) 'the relationship between work performance and attitudinal variable is far from straightforward. Performance is multiply determined, and it is probably unreasonable to expect any attitudinal variable, including judgments of procedural fairness, to have simple effects on performance.' Hence, opportunities exist for future research to ascertain whether the model developed for this study could be used to investigate (1) if procedural fairness affects job performance in the same manner as it affects job satisfaction.; or (2) if the effects of procedural fairness on performance is indirect through job satisfaction; or (3) if a different model is needed to study job performance. Some studies (e.g. Libby, 1999; Lau and Moser, 2008) had found procedural fairness to be related to performance. Performance, in turn, may be related to job satisfaction. Employees who perform well may experience high job satisfaction. This suggests that the effects of procedural fairness on job satisfaction may be indirect through job performance. These suggestions provide opportunities for future research to incorporate job performance not only as a possible dependent variable, but also as an intervening variable in the relationships between procedural fairness and attitudinal outcomes.

Notwithstanding the aforementioned limitations, our study provides important empirical evidence and insights into how fairness perceptions of management accounting procedures can affect subordinates' attitudes. Hopefully, this may assist in the development of a unified theory for this research area.

References

Adams, J.S. (1965). 'Inequity in social exchange'. In L. Berkowitz (Ed.) *Advances in Experimental Social Psychology*, 2: 267–299. New York: Academic Press.

Allen, N.J. and Meyer, J.P. (1990). 'The measurement and antecedents of affective, continuance and normative commitment to the organization'. *Journal of Occupational*

Psychology, 63: 1–18.

Arbuckle, J. (2006). *AMOS Version 7*, Chicago, IL: Smallwaters Corporation.

Bacon, L.D. (1997). 'Using Amos for structural equation modeling in market research'. *SPSS White Paper*, SPSS Inc.

Barrett-Howard, E. and Lamm, H. (1986). *Procedural and Distributive Justice: Definitions and Beliefs of West German University Students*. Unpublished manuscript, Northwestern University.

Barrett-Howard, E. and Tyler, T.R. (1986).'Procedural justice as a criterion in allocation decisions'. *Journal of Personality and Social Psychology*, 50: 296–304.

Bartol, K. M. (1983). 'Turnover among DP personnel: a causal analysis'. *Communications of the ACM*, 26: 807–811.

Bateman, T. and Strasser, S. (1984). 'A longitudinal analysis of the antecedents of organizational commitment'. *Academy of Management Journal*, 27: 95–112.

Bentler, P.M. (1995). *EQS Structural Equation Program Manual*. Encino, CA: Multivariate Software, Inc.

Brett, J. M. (1986). 'Commentary on procedural justice papers'. In Lewiski R., Bazerman, M., and Sheppard, B. (Eds.), *Research on negotiation in organizations*, 1: 81–90.

Browne, M.W. and Mels, G. (1994). *RAMONA User's Guide*, The Ohio State University, Columbus, Ohio.

Brownell, P. (1982). 'The role of accounting data in performance evaluation, budgetary participation, and organizational effectiveness'. *Journal of Accounting Research*, 20 (1): 12–27.

Brownell, P. and Dunk, A.S. (1991). 'Task uncertainty and its interaction with budgetary participation and budget emphasis: Some methodological issues and empirical investigation'. *Accounting, Organizations and Society*, 16(8): 693–703.

Chenhall, R. H. and Brownell, P. (1988). 'The effect of participative budgeting on job satisfaction and performance: role ambiguity as an intervening variable'. *Accounting, Organizations and Society*, 13 (3): 225–233.

Cohen, A. (1993). 'Organizational commitment and turnover: A meta analysis'. *Academy of Management Journal*, 36 (5): 1140–1157.

DeCotiis, T.A. and Summers, T.P. (1987). 'A path analysis of a model of the antecedents and consequences of organizational commitment'. *Human Relations*, 40: 445–470.

Earley, P.C. (1984). *Informational mechanisms of participation influencing goal acceptance, satisfaction and performance*. Doctoral dissertation, University of Illinois, Champaign.

Folger, R. (1986). 'Rethinking equity theory: a referent cognition model'. In *Justice in Social Relations*, edited by Bierhoff, H.W., Cohen, R.L. and Greenberg, J. , 145–164, New York: Plenum Press.

Folger, R. and Konovsky, M.A. (1989). 'Effects of procedural and distributive justice on reactions to pay raise decisions'. *Academy of Management Journal*, 32 (1): 115–130.

Frucot, V. and Shearon, W.T. (1991). 'Budgetary participation, locus of control, and Mexican managerial performance and job satisfaction'. *Accounting Review*, 66: 80–99.

Greenberg, J. (1993). 'The social side of fairness: Interpersonal and informational classes of organizational justice'. In *Justice in the Workplace: Approaching Fairness in Human Resource Management*, edited by Cropanzano, R.: 79–103, Hillsdale, NJ: Lawrence Erlbaum Press.

Greenberg, J. and Folger, R. (1983). 'Procedural justice, participation and the fair process effect in groups and or-

ganizations'. In *Basic Group Process*, edited by P. Paulus: 235–256. New York: Springer-Verlag.

Harrison, G. L. (1992). 'The cross cultural generalizability of the relation between participation, budget emphasis and job related attitudes'. *Accounting, Organizations and Society*, 17 (1): 1–15.

Hartmann, G.H. (2000). 'The appropriateness of RAPM; toward the further development of theory'. *Accounting, Organizations and Society*, 25: 451–482.

Hartwick, J. and Barki, H. (1994). Explaining the Role of User Participation in Information System Use. *Management Science* 40(4): 440–465.

Hopwood, A.G. (1972). 'An empirical study of the role of accounting data in performance evaluation'. *Journal of Accounting Research*, Supplement, 10: 156–182.

Horngren, C.T., Foster, G. and Datar, S.M. (2006). *Cost Accounting, A Managerial Emphasis*, 12th edn. Prentice-Hall, USA.

Kaplan, R. and Atkinson, A., 1998. *Advanced Management Accounting*. 3rd edn, USA: Prentice Hall.

Ketchand, A.A. and Strawser, J.R. (2001). 'Multiple dimensions of organizational commitment: implications for future accounting research'. *Behavioral Research in Accounting*, 13: 221–251.

Konovsky, M. and Pugh, S. (1994). 'Citizenship behavior and social exchange'. *Academy of Management Journal*, 37 (3): 656–669

Lau, C.M. and Lim, E. (2002). 'The effects of procedural justice and evaluative styles on the relationship between budgetary participation and performance'. *Advances in Accounting*, 19: 139–160.

Lau, C.M., Low, L.C. and Eggleton, I.R. (1995). 'The impact of reliance on accounting performance measures on job-related tension and managerial performance: additional evidence'. *Accounting, Organizations and Society*, 20 (5): 359–381.

Lau, C.M. and Moser, A. (2008). 'Behavioral effects of nonfinancial performance measures: the role of procedural fairness'. *Behavioural Research in Accounting*, Forthcoming.

Lau, C.M. and Sholihin, M. (2005). 'Financial and nonfinancial performance measures: how do they affect job satisfaction?' *The British Accounting Review*, 37: 389–423.

Leventhal, G.S. (1980). 'What should be done with equity theory? New approaches to the study of fairness in social relationships'. In K. Gergen, M. Greenberg, and R. Willis (Eds.) *Social Exchanges: Advances in Theory and Research*: 257–55. New York; Plenum Press.

Libby, T. (1999). 'The influence of voice and explanation on performance in a participative budgeting setting'. *Accounting, Organizations and Society*, 24 (2): 125–137.

Lind, E. A. and Tyler, T.A. (1988). *The social psychology of procedural justice*. New York: Plenum Press.

Lindquist, T.M. (1995). 'Fairness as an antecedent to participative budgeting: examining the effects of distributive justice, procedural justice and referent cognitions on satisfaction and performance'. *Journal of Management Accounting Research*, 7: 122–147.

Locke E.A. and Latham, G.P. (1990). *A Theory of Goal Setting and Task Performance*, Prentice Hall, Englewood Cliff, New Jersey.

Locke, E.A. (1976). 'The nature and causes of job satisfaction'. In M.D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology*, 1297–1350, New York: Wiley.

Magner, N. and Johnson, G. (1995). 'Municipal officials' reactions to justice in budgetary resource allocation'. *Public Administration Quarterly*, 18: 439–457.

Magner, N. and Welker, R.B. (1994). 'Responsibility cen-

ter manager's reactions to justice in budgetary resource allocation'. *Advances in Management Accounting*, 3: 237–253.

Magner N., Welker, R.B. and Campbell, T.L. (1995). 'The interactive effect of budgetary participation and budget favorability on attitudes toward budgetary decision makers: A research note'. *Accounting, Organizations and Society*, 20 (7/8): 611–618.

McFarlin, D.B. and Sweeney, P.D. (1992). 'Distributive and procedural justice as predictors of satisfaction with personal and organizational outcomes'. *Academy of Management Journal*, 35 (3): 626–637.

Merchant, K. and van der Stede, M. (2007). *'Management Control Systems: Performance Measurement, Evaluation and Incentive'*, 2nd edn, Prentice-Hall, Upper Saddle River, N.J.

Merton, R.K. and Rossi, A.S. (1957). 'Contribution to the theory on reference group behavior'. In Merton, R.K. (Ed.), *Social Theory and Social Structure*: 225–280, New York: Free Press.

Messick, D.M., Bloom, S., Boldizar, J.P. and Samuelson, C.D. (1985). 'Why we are fairer than others'. *Journal of Experimental Social Psychology*, 21: 480–500.

Mikula, G. (1986). 'The experience of injustice: Toward a better understanding of its phenomenology'. In Bierhoff, H.W., Cohen, R.L., and Greenberg, J. (Eds.), *Justice in Social Relations*: 103–124, New York: Plenum Press.

Mowday, R.T., Steers, R.M. and Porter, L.W. (1979). 'The measurement of organizational commitment'. *Journal of Vocational Behavior*, 14 (2): 224–247.

Nouri, H. and Parker, R.J. (1998). 'The relationship between budget participation and job performance: the roles of budget adequacy and organizational commitment'. *Accounting, Organizations and Society*, 23 (5/6): 467–483.

Oppenheim, A. N. (1992). *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter Publishers.

Otley, D. T. (1978). 'Budget use and managerial performance'. *Journal of Accounting Research* 16 (1): 122–149.

Paese, P. (1985). *Procedural Fairness and Work Group Responses to Performance Evaluation Procedures*. Unpublished thesis, University of Illinois, Champaign.

Pedhazur, E.J. (1982). *Multiple Regression in Behavioral Research*. New York: Holt, Rinhart & Winston.

Porter, L.W., Steers, R.M., Mowday, R.T. and Boulian, P.V. (1974). 'Organizational commitment, job satisfaction, and turnover among psychiatric technicians'. *Journal of Applied Psychology*, 59: 603 – 609.

Price, J.L. and Mueller, C.W. (1981). 'A causal model of turnover for nurses'. *Academy of Management*, 24: 543–565.

Read, W. H. (1962). 'Upward communication industrial hierarchies'. *Human Relations*, 15: 3–16.

Ross, A. (1994). 'Trust as a moderator of the effect of performance evaluation style on job related tension: a research note'. *Accounting, Organizations and Society*, 19 (7): 629–635.

Rousseau, D.M., Sitkin, S.B. Burt, R.S. and Camerer, C. (1998). 'Not so different after all: a cross discipline view of trust'. *Academy of Management Review*, 23 (3): 393–404.

Segars, A.H., and Grover, V. (1993). Re-examining Perceived Ease of Use and Usefulness: A Confirmatory Factor Analysis. *MIS Quarterly* 17 (4): 517–525.

Staley, A.B. and Magner, N.R. (2006). 'Budgetary fairness, supervisory trust, and the propensity to create budgetary slack: Testing a social exchange model in a government budgeting context'. Unpublished working paper.

Steer, R.M. (1977). 'Antecedents and outcomes of organizational commitment'. *Administrative Science Quarterly*, 22: 46–56.

Tang, T.L. and Sarsfield-Baldwin L.J. (1996). 'Distributive and procedural justice as related to satisfaction and commitment'. *SAM Advanced Management Journal*, 61 (3): 25–31.

Thibaut, J. and Walker, L. (1975). *Procedural justice: a psychological analysis*. Hillside N.J.: Lawrence Erlbaum Associates.

Thibaut, J. and Walker, L. (1978). A theory of procedure. *California Law Review*, 66: 541–566.

Weiss, D.J., Dawis, R.V., England, G.W., and Lofquist, L.H. (1967). *Manual for the Minnesota satisfaction questionnaire. Minnesota studies in vocational rehabilitation*, 22. Minneapolis: University of Minnesota, Industrial Relations Center, Work Adjustment Project.

Wentzel, K. (2002). 'The influence of fairness perceptions and goal commitment on managers' performance in a budget setting'. *Behavioral Research in Accounting*, 14: 247–271.

Intellectual capital disclosure and corporate governance structure in UK firms

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Abstract—This paper investigates the relationship between intellectual capital disclosure and corporate governance variables, controlling for other firm-specific characteristics, for a sample of 100 UK listed firms. Intellectual capital disclosure is measured by a disclosure index score, supported by word count and percentage of word count metrics to assess the variety, volume and focus of intellectual capital disclosure respectively. The independent variables comprise various forms of corporate governance structure: board composition, ownership structure, audit committee size and frequency of audit committee meetings, and CEO role duality. Results of the analysis based on the three measures of intellectual capital disclosure indicate significant association with all the governance factors except for role duality. The influence of corporate governance mechanisms on human, structural and relational capital disclosure, based on all three metrics, is also explored.

Keywords: intellectual capital disclosure; corporate governance; content analysis; annual report

1. Introduction

The purpose of this paper is to investigate the influence of corporate governance on intellectual capital disclosure in corporate annual reports, controlling for other firm characteristics. Intellectual capital is increasingly recognised as having much greater significance in creating and maintaining competitive advantage and shareholder value (Tayles et al., 2007). Definitions of intellectual capital vary (for example, Stewart, 1997; Mouritsen, 1998). One of the most comprehensive definitions of intellectual capital is offered by CIMA (2001): '... the possession of knowledge and experience, professional knowledge and skill, good relationships, and technological capacities, which when applied will give organisations competitive advantage.' Sveiby (1997) suggests that the concept of intellectual capital can be categorised into human, structural and organisational capital, while Guthrie and Petty (2000) offer an alternative categorisation: internal structure, external structure and human capital. The various forms of intellectual capital disclosure are valuable information for investors as they help reduce uncertainty about future prospects and facilitate a more precise valuation of the company (Bukh, 2003). However, financial reports fail to reflect such a wide range of value-creating intangible assets (Lev and Zarowin, 1999), giving rise to increasing information asymmetry between firms and users (Barth et al., 2001),

and creating inefficiencies in the resource allocation process within capital markets.

A number of research reports (e.g. FASB, 2001; ASB, 2007) and academic studies (e.g. Lev, 2001; Mouritsen et al., 2001) have called for greater disclosure of non-financial indicators of investment in intangible assets. Cañibano et al. (2000) argue that the cost associated with a radical change in the accounting system to make it more value relevant for intellectual capital intensive firms is unaffordable and that the sensible approach towards the enhancement of financial reports is to encourage voluntary disclosure of intellectual capital information.

Keenan and Aggestam (2001) argue that responsibility for the prudent investment of intellectual capital resides with corporate governance, and that, depending on the firm's characteristics and orientation, the governance of publicly-owned firms may need to develop new structures and processes in annual reports for communicating information about the value created for stakeholders through the firm's intellectual capital. However, as discussed in a later section, the empirical evidence from prior studies is limited, with small sample sizes prohibiting more rigorous statistical analysis and external validity. For example, we know very little about the main determinants of the variation in levels of intellectual capital disclosure in annual reports across firms, including the effects of good governance mechanisms.

This paper examines the influence of corporate governance factors on intellectual capital disclosure, and the subcategories comprising it, using various disclosure measures. We hypothesise that significant relationships exist between intellectual capital disclosure in annual reports and board composition, role duality, ownership concentration, audit committee size and frequency of audit com-

mittee meetings, controlling for listing age, firm size and profitability. Using content analysis and regressing the three forms of intellectual capital disclosure measures on the explanatory variables, we find support for all hypotheses with the exception of role duality.

The remainder of this paper is organised as follows: the next section reviews the empirical literature on intellectual capital disclosure. The hypothesis development is outlined in Section 3, followed by the research design in Section 4. Section 5 presents findings on intellectual capital disclosure practices from multiple regression analyses, and examines the working hypotheses. Finally, Section 6 discusses the findings, implications and limitations of the study.

2. Literature on intellectual capital disclosure studies

Information on intellectual capital is important to stakeholders in their decision-making. Within an agency context, Jensen and Meckling (1976) argue that greater disclosure reduces the uncertainty facing investors and thus reduces a firm's cost of capital. Managers should therefore be willing to disclose intellectual capital information in order to enhance the firm's value by providing investors with a better assessment of the financial position of the firm and help reduce the volatility of stock returns. Barth et al. (2001) observe that analyst coverage is greater for firms investing more heavily in research and development and advertising, while empirical studies suggest a positive share price impact arises from specific intellectual capital indicators such as research and development (R&D) expenditure (Amir and Lev, 1996), capitalisation of software development expenditure (Aboody and Lev, 1998), and customer satisfaction (Ittner and Larker, 1998).

Gibbins et al. (1990) explore the voluntary disclosure process giving rise to disclosure outputs in response to internal and external stimuli. They argue that a company's readiness to disclose is a function of its general disclosure position (for example, an uncritical adherence to information disclosure norms or to use disclosure as opportunity to gain advantage or boost stock price), antecedents (for example, corporate history, corporate strategy, and market factors), structure, and the use of consultants and advisors. While corporate governance mechanisms are not specifically identified, they have relevance to all these independent variables, particularly to structure, where governance involves the establishing of clear policies.

Abeysekera (2006) observes that the development of a theoretical framework underlying intellectual capital disclosure is in its infancy, with few studies providing a strong theoretical basis for interpreting their findings. However, the literature offers a few theoretical perspectives that may help

explain the variation of intellectual capital disclosure. These include arguments based on legitimacy and stakeholders (Abeysekera and Guthrie, 2005), signalling (García-Meca and Martínez, 2005), media agenda setting (Sujan and Abeysekera, 2007), agency (Patelli and Prencipe, 2007), and information asymmetry (Amir and Lev, 1996).

In a review of the current state of financial and external reporting research, Parker (2007) identified intellectual capital accounting as a major area for further research. Most intellectual capital disclosure studies are cross-sectional and country specific. Examples include studies in Australia (e.g. Guthrie and Petty, 2000; Sujan and Abeysekera, 2007), Ireland (Brennan, 2001), Italy (e.g. Bozzolan et al., 2003), Malaysia (Goh and Lim, 2004), UK (e.g. Williams, 2001), and Canada (Bontis, 2003). Relatively few longitudinal studies have been reported (e.g. Abeysekera and Guthrie, 2005). Some studies focus on specific aspects of intellectual capital disclosure, such as human capital reporting (e.g. Subbarao and Zeghal, 1997), while others conduct international comparative studies (e.g. Vergauwen and van Alem, 2005; Cerbioni and Parbonetti, 2007). Some intellectual capital disclosure studies have looked beyond annual reports to examine other communication channels such as analyst presentations (García-Meca et al., 2005).

Most intellectual capital disclosure studies employ content analysis as the research method, but some use questionnaire surveys (e.g. Bontis, 1998). Guthrie and Petty's (2000) analysis of intellectual capital reporting practices suggests that disclosure has been expressed in discursive rather than numerical terms and that little attempt has been made to translate the rhetoric into measures that enable performance of various forms of intellectual capital to be evaluated.

Studies have also been conducted to explore intellectual capital related issues from the firm's perspective. Chaminade and Roberts (2003) investigate the implementation of intellectual capital reporting systems in Norway and Spain. Habersam and Piper (2003) employ case studies to explore the relevance and awareness of intellectual capital in hospitals. Studies that looked at possible determinants of voluntary intellectual capital disclosure include García-Meca et al. (2005) and Cerbioni and Parbonetti (2007). Based on analyst presentation reports of listed Spanish companies, García-Meca et al. (2005) found significant association between intellectual capital disclosure and size and type of disclosure meeting but not ownership diffusion, international listing status, industry type and profitability. Based on analysis of European Biotechnology companies over a period of three years, Cerbioni and Parbonetti (2007)

found governance related variables to strongly influence voluntary intellectual capital disclosure.

In the UK, there has been a limited number of intellectual capital disclosure studies compared to its European counterparts. Williams (2001) conducted a cross-sectional study of 31 companies while Beattie et al. (2002) undertook a study of 11 companies in the food sector. The small sample sizes restrict generalisation and meaningful interpretation of intellectual capital disclosure. Roslender and Fincham (2004) explore intellectual capital awareness among UK firms, and the reasons and motives underlying such interest.

The foregoing discussion suggests that the literature on the determinants of intellectual capital disclosure is limited and inconclusive. Our study builds on the previous literature of intellectual capital disclosure practice within a UK context and examines its relationship with corporate governance structures, listing age, profitability and size.

3. Determinants of intellectual capital disclosure and development of hypotheses

Corporate governance mechanisms

Corporate governance is a framework of legal, institutional, and cultural factors shaping the patterns of influence that stakeholders exert on managerial decision-making (Weimer and Pape, 1999). The justification for considering corporate governance is that the board of directors manages information disclosure in annual reports and therefore constituents of boards may be important. Holland (2006a: 147) found that boards of directors are at the heart of corporate financial communications, having active roles in the disclosure process related to: (1) the provision of primary information regarding the corporate value-creation process, and their contribution towards it; (2) the provision of information about themselves in terms of their skills in managing the business; (3) the manner in which they are organised to conduct financial communications; (4) their reputation for disclosure honesty; and (5) information about how their own pay and wealth is tied to company fortunes.

Agency theory provides a framework for linking voluntary disclosure behaviour to corporate governance, whereby control mechanisms are designed to reduce the agency problem arising from the separation between ownership and management (Welker, 1995). This argument can be extended to intellectual capital disclosure, whereby management can determine the level of disclosure and thereby reduce investor uncertainty relating to the impact of intellectual capital on the firm's value. High intellectual capital disclosure is therefore expected to provide a more intensive monitoring package for a firm to reduce opportunistic behaviour and information asymmetry.

Adoption of internal control devices, such as audit committees and non-executive directors, and separation of the roles of chairman and chief executive, may enhance monitoring quality in critical decisions about intellectual capital investment and performance (Keenan and Aggestam, 2001). This is likely to reduce the scope for managerial opportunism and reduce benefits from withholding information, and, as a consequence, intellectual capital disclosure in annual reports should be improved.

Board composition – proportion of independent non-executive directors (INED)

The board of directors is an internal control mechanism intended to take decisions on behalf of the shareholders and to ensure that management behaviour is consistent with owners' interests. Based on resource dependence theory, Haniffa and Cooke (2005) argue for more non-executive directors on the board as they can provide wider expertise, prestige and contacts, and play a key role in influencing disclosure. Extending this argument, and that of Gibbins et al. (1990), to intellectual capital, we suggest that the wider expertise and experience of non-executive directors on the board will encourage management to take a disclosure position beyond a ritualistic, uncritical adherence to prescribed norms, to a more proactive position reflecting the value relevance of intellectual capital to stakeholders.

Findings from prior voluntary disclosure studies that considered board composition as a possible determinant of voluntary disclosure are mixed; some find that the proportion of non-executive directors is positively related with the board's ability to influence voluntary disclosure decisions (e.g. Beasley, 1996; Chen and Jaggi, 2000), others find no relationship (Ho and Wong, 2001; Brammer and Pavelin, 2006), and yet others observe a negative relationship (Eng and Mak, 2003; Haniffa and Cooke, 2005). One reason may be that non-executive directors are not necessarily independent. Independent non-executive directors are typically individuals with relevant expertise and professional reputations to defend, with no management role or links with the company.[1] Cotter and Silvester

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[1] The revised Combined Code (2006) recommends that at least half of the board, excluding the chairman, should comprise non-executive directors determined by the board to be independent as defined by criteria in the Code, in order that non-executive directors are able to discharge their responsibilities in an objective manner, without interference, bias or favouritism. For example, a director should not have been an employee of the group within the last five years, had a material business relationship with the company within the last three years, received additional remuneration from the company apart from a director's fee, participate in the company's share option or a performance-related pay scheme, close family ties with any of the company's advisers, directors or senior employees, hold cross-directorships or significant links with directors, or served on the board for more than nine years.

(2003) argue that independent non-executive directors are in a better position to monitor executive management. In one of the few studies capturing independent non-executive directors, Patelli and Prencipe (2007) found a positive correlation with the amount of voluntary information disclosed by companies in their annual reports. We also capture independent non-executive directors (INED) and argue that:

H1: There is a positive relationship between the level of intellectual capital disclosure and the proportion of independent non-executive directors to the total number of directors on the board, *ceteris paribus*.

Role duality (RDUAL)

Another way to examine independence of the board is to consider role duality, a board leadership structure in which the same person undertakes both the roles of chief executive and chairman.[2] There is widespread acknowledgement that a dominant personality commanding a firm may be detrimental to the interests of shareholders, and this phenomenon has been found to be associated with poor disclosure (Forker, 1992) and CEO entrenchment, resulting in ineffective monitoring of managerial opportunistic behaviour (Haniffa and Cooke, 2002). Concentration of decision-making power resulting from role duality could impair the board's oversight and governance roles, including disclosure policies. Separation of the two roles provides the essential checks and balances on management behaviour (Blackburn, 1994), as recommended in the revised Combined Code (2006).[3] Employing similar arguments for role duality as for independent non-executives, we hypothesise that:

H2: There is a negative relationship between the level of intellectual capital disclosure and role duality, *ceteris paribus*.

Ownership structure – share concentration (SCON)

The power of stakeholders to influence management is a function of the resources they control that are essential to the corporation (Smith et al., 2005). Ownership structure therefore will influence the level of monitoring and thereby the level of voluntary disclosure (Eng and Mak, 2003). Agency theory argues that with greater ownership diffusion, firms are more likely to experience pressure from shareholders for greater disclosure to reduce agency costs and information asymmetry (Raffournier, 1995). In contrast, firms with closely-held ownership are expected to have less information asymmetry between management and dominant shareholders who typically have access to the information they need and can provide an

active governance system that is difficult for smaller, more passive and less-informed investors (Cormier et al., 2005).[4] This is particularly relevant to intellectual capital disclosure because fund managers have access to such information via private communication channels (Holland, 2006b). Hence, we hypothesise that:

H3: There is a negative relationship between the level of intellectual capital disclosure and concentrated share ownership, *ceteris paribus*.

Audit committee size (SAC) and frequency of meetings (MAC)

Board monitoring is a function of not only the structure and composition of the board, but also of the board's subcommittees where much of the important processes and decisions are monitored and taken (Cotter and Silvester, 2003). The role of audit committees has developed over the years to meet the challenges of changing business, social and economic environments. The Smith Report (2003) in the UK identifies the role of audit committees as ensuring that the interests of shareholders are properly protected in relation to financial reporting and internal control. It further recommends audit committees to review the significant financial reporting issues and judgments made in connection with the preparation of the company's financial statements, interim reports, preliminary announcements and related formal statements, such as the operating and financial review and the release of price-sensitive information. As such, audit committees can be expected to have a significant impact on value-relevant information disclosure, of which intellectual capital forms a large element in many firms.

Effective audit committees should improve internal control and act as a means of attenuating agency costs (Ho and Wong, 2001), and as a powerful monitoring device for improving value-relevant intellectual capital disclosure. The presence of an audit committee has been found to be associated with more reliable financial reporting

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[2] Role duality is not common among listed companies since the majority comply with the recommended code of corporate governance.

[3] However, in voluntary disclosure studies, Haniffa and Cooke (2002) and Ho and Wong (2001) failed to find any relationship between the extent of voluntary disclosure and role duality.

[4] Prior disclosure studies provide mixed evidence. Cormier et al. (2005) and Brammer and Pavelin (2006) find significant negative associations between ownership concentration and engagement in environmental reporting practices. Patelli and Prencipe (2007) find a positive relationship between share ownership diffusion and voluntary disclosure. However, Eng and Mak (2003) fail to find any significant association between blockholder ownership and voluntary disclosure.

(McMullen, 1996), enhanced quality and increased disclosure (Ho and Wong, 2001). However, Mangena and Pike (2005) find no relationship between audit committee size and the extent of voluntary disclosure in interim reports. Inactive audit committees are unlikely to monitor management effectively and adequate meeting time should be devoted to the consideration of major issues (Olson, 1999). Price Waterhouse (1993) recommended that audit committees should hold a minimum of three or four meetings a year and special meetings when necessary.

Given the increasing importance of intellectual capital, we expect larger audit committees, meeting more frequently, to have greater influence in overseeing intellectual capital disclosure practice. Therefore, our next two hypotheses are as follows:

H4: There is a positive relationship between the level of intellectual capital disclosure and audit committee size, *ceteris paribus*.

H5: There is a positive relationship between the level of intellectual capital disclosure and frequency of audit committee meetings, *ceteris paribus*.

Control variables

The length of time a company has been listed on a capital market (AGE) may be relevant in explaining the variation of disclosures. Younger listed companies without an established shareholder base are expected to be more reliant on external fund raising than more mature companies (Barnes and Walker, 2006) and have greater need to reduce scepticism and boost investor confidence (Haniffa and Cooke, 2002). Hence, we expect a negative relationship between firms' listing age and level of intellectual capital disclosure. Profitability (ROA) may be the result of continuous investment in intellectual capital and firms may engage in higher disclosure of such information to signal the significance of their decision in investing in it for long-term growth in the value of the firm. We therefore expect a positive relationship between profitability and level of intellectual capital disclosure. Large firms are more visible and more likely to meet investors' demand for information and we expect a positive relationship between size of company (SA) and level of intellectual capital disclosure.

4. Research method

4.1. Sampling design

This study examines intellectual capital disclosure in corporate annual reports of UK fully listed companies on the London Stock Exchange (LSE) for financial year-ends between March 2004 and February 2005. Firms in seven industry sectors containing high intellectual capital companies (Pharmaceuticals & Biotechnology, IT,

Telecommunications, Business Services, Media & Publishing, Banking & Insurance, and Food Production & Beverage) were selected.[5] This provided us with a population size of 319 companies, from which a sample size of 100 was selected (31%). As the number of companies in each industry group is not the same, proportionate stratified sampling was applied (Moser and Kalton, 1996).

4.2. Development of the research instrument

Content analysis was used to collect the necessary data. An essential element of content analysis is the selection and development of categories into which content units can be classified. Various authors (e.g. Sveiby, 1997; Meritum, 2002) suggest that intellectual capital can be grouped into three subcategories: (1) Human capital, for example, staff education, training, experience, knowledge and skills, (2) Structural capital, covering internal structures such as R&D, patents, management processes, and (3) Relational capital, covering external relationships such as customer relations, brands and reputation. These forms of intellectual capital can be leveraged to create competitive advantage and value for stakeholders. However, Beattie and Thomson (2007) observe that there is no consensus or precise definition of the constituents of such categories, giving rise to difficulties for annual report preparers and researchers seeking to quantify intellectual capital disclosure. Habersam and Piper (2003) argue for a comprehensive representation of intellectual capital, including metric and non-metric forms, in order to better discern its different dimensions and degrees of transparency. They further suggest a fourth intellectual capital category, namely 'Connectivity Capital' linking the other three forms.

The categories and items in our research instrument were drawn from previous literature on intellectual capital definition and classification. The majority of previous intellectual capital disclosure studies have adopted or adapted Sveiby's (1997) intellectual capital framework, which typically contains 22–25 items (Beattie and Thomson, 2007). The problem with too few coding categories is that it potentially increases the likelihood of random agreement in coding decisions and subsequently results in an overestimation of reliability (Milne and Adler, 1999). Similarly, higher numbers of items in the instrument increase the complexity (Beattie and Thomson, 2007) and may potentially increase coding errors (i.e. reliability) (Milne and Adler, 1999). However, in order to achieve greater variation and better understanding of intellectual capital disclosure, we devised a

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more detailed checklist covering items relating to
the three themes: human capital (HIC), structural
capital (SIC) and relational capital (RIC), captur-
ing information in the forms of text, numerical and
graphical/pictorial. While Guthrie and Petty
(2000) highlight the difficulty in seeking to quan-
tify the qualitative aspects of intellectual capital,
evidence from Habersam and Piper (2003) ques-
tions this view. All items in the designed research
instrument were considered equally applicable and
therefore equally capable of disclosure across all
sample firms in all three formats.

The initial draft of the research instrument with
150 items was pilot tested by one researcher, using
a sample of annual reports (not included in the
final sample). Based on feedback from the pilot
test and discussion with two other researchers, the
instrument was further modified to ensure that it
captured the necessary and desired information for
which it was designed. The research instrument
was reduced to 61 intellectual capital items in
three forms. The operational definitions and cod-
ing rules (see Appendix) were defined by one re-
searcher and checked and agreed by the other two
researchers.

Measurement of dependent variables

Beattie and Thomson (2007) argue that many of
the content analysis research methods adopted in
prior studies for intellectual capital disclosure
measurement lack transparency, specificity, uni-
formity and rigour, and that these deficiencies may
give rise to misleading evidence. In this study,
scoring of the research instrument was performed
manually covering the whole annual report.[6]

The dependent variable, intellectual capital dis-
closure, is measured using three different metrics:
disclosure index (ICDI) to indicate the variety;
word count (ICWC) to represent the volume; and
word count as a percentage of annual report total
word count (ICWC%) to indicate focus in the an-
nual report. Our approach in scoring the items in
the research instrument for the purpose of the dis-
closure index is essentially dichotomous in that an
item scores one if disclosed and zero, if it is not.[7]
The intellectual capital disclosure index $ICDI_j$ for
each company is calculated based on the disclo-
sure index score formula used in Haniffa and
Cooke (2005) as follows:

$$ICDI_j = \frac{\sum_{i=1}^{n_j} X_{ij}}{n_j}$$

where n_j = number of items for j^{th} firm, n_j = 183
(i.e. 61 items in three formats), X_{ij} = 1 if i^{th} item
disclosed, 0 if i^{th} item not disclosed, so that $0 \leq$
$ICDI_j \leq 1$.

The use of a dichotomous procedure in scoring
the instrument for the disclosure index can be crit-

icised because it treats disclosure of one item (re-
gardless of its form or content) as being equal, and
does not indicate how much emphasis is given to a
particular content category. To capture the volume
of intellectual capital content and to partly over-
come the problem of using an index score, this
study introduces another form of measure, namely
intellectual capital word count (ICWC). Words are
the smallest unit of measurement for analysis and
can be expected to provide the maximum robust-
ness to the study in assessing the quantity of dis-
closure (Zeghal and Ahmed, 1990). Using the
same research instrument, and taking 'phrases', or
what Beattie and Thomson (2007) term 'pieces of
information' as the basis of coding, the number of
words relating to each intellectual capital item in
the checklist was counted and added together to ar-
rive at ICWC for each company. Graphical and
pictorial messages were excluded from the word
count measure.[8]

Coding under 'phrases' and word count avoids
the problem of coding sentences in terms of deci-
sions over dominant themes, and the 'phrases' re-
main meaningful in their own right, while enabling
the measuring of the amount of information pro-
vided. Coding annual reports into 'phrases' is a
three-stage process involving: (1) selection of sen-
tences containing intellectual capital information;
(2) splitting such sentences into 'phrases' and se-
lecting only those relating to intellectual capital;
and (3) coding 'phrases' under each relevant
item(s) in the research instrument. Where a

[6] Three coders independently coded the same four annual
reports and Krippendorff's (1980) alpha was used to test for
reliability as it can account for chance agreement among mul-
tiple coders. The independent scores were all above the mini-
mum 80% threshold for content analysis to be considered
reliable (Riffe et al., 2005) and this was achieved after a sec-
ond round of independently coding another four annual re-
ports. Only one researcher completed the coding for the
remaining 92 annual reports. To aid consistency of scoring, the
research instrument was completed by one researcher, and to
increase reliability of measurement, rescoring was done on a
random selection of 10 firms three months after initial analy-
sis, which confirmed over 90% consistent identification of
content in the annual reports.
[7] Many prior intellectual capital disclosure studies have
adopted the dichotomous (0:1) coding scheme in measuring
intellectual capital disclosure, which is mainly for examining
the presence/absence of intellectual capital items (e.g. Guthrie
and Petty, 2000; Brennan, 2001). Some intellectual capital dis-
closure studies used weighted coding schemes, which give
uneven scores for quantitative and qualitative information
(e.g. Bozzolan, et al., 2003; Sujan and Abeysekera, 2007).
Consistent with Cooke (1989), items were not weighted be-
cause of potential scoring bias and scaling problems.
[8] Beattie and Thomson (2007) identify the problems with
word count (such as print size, colour, font variations and dis-
closures in graphs/pictures format), and propose a measure ad-
dressing the differentiation in length and number of sentences
used in expressing similar meanings encountered by coding
sentences.

'phrase' relates to more than one item in the checklist and cannot be split, it is then coded under all the related items and the word count is evenly distributed across all the items coded. An example is shown as follows,

> 'The trust and confidence of all our stakeholders, together with our reputation, are among our most valuable assets.' (AstraZeneca plc 2004 Annual report).

The sentence was split into three 'phrases': (1) The trust and confidence of all our stakeholders, (2) together with our reputation, (3) are among our most valuable asset. Phrase 1 was coded under 'relationship with stakeholders', phrase 2 was coded under 'company reputation' and phrase 3 was equally distributed between the two items.

Krippendorff (1980) further notes that words are a preferred measure when it is intended to measure the amount of total space devoted to a topic and to ascertain the importance of that topic. Although word count is not assumed to be representative of the quality of disclosure, it is assumed to be indicative of the overall responsiveness by corporate management.[9] The greater the number of words related to intellectual capital being disclosed in relation to the total number of words in the annual reports, the greater the emphasis given by management on intellectual capital information. Hence, we introduced a third measure, ICWC%, which is the proportion of intellectual capital word count to the total word count of the whole annual report. This measure captures the intellectual capital focus in the annual report. For example, a firm with a short annual report may have a low ICDI and ICWC but a high ICWC%, conveying to the reader the importance placed by management on intellectual capital information.

Measurement of independent variables

The independent variables are categorised into two groups: corporate governance and control variables. Data are drawn from corporate annual reports and Thomson Research. Table 1 summarises the operationalisation of both independent and dependent variables.

4.3. Data analysis

Multiple regression is used to test the relationship between intellectual capital disclosure (based on each of the three measures) and the various corporate governance and control variables. To identify potential multicollinearity problems, the correlations between independent variables were reviewed and the variance inflation factors (VIF) computed. In addition, tests were conducted for normality, based on skewness and kurtosis and Kolmogorov-Smirnov Lilliefors (for goodness of fit), for all dependent and continuous independent

variables and when normality was a problem, the data was transformed.[10] An analysis of residuals, plots of the studentised residuals against predicted values as well as the Q-Q plot were conducted to test for homoscedasticity, linearity and normality assumptions. The regression equation is as follows:

$$ICD = \beta_0 + \beta_1\ INED_i + \beta_2\ RDUAL_i$$
$$+ \beta_3\ SqSCON_i + \beta_4\ SAC_i$$
$$+ \beta_5\ MAC_i + \beta_6\ LnAGE_i$$
$$+ \beta_7\ ROA_i + \beta_8\ LnSA_i + \varepsilon_i$$

Where,

ICD	= Intellectual capital disclosure index (ICDI), log of intellectual capital word count (LnICWC), or intellectual capital word count percentage (ICWC%);
$INED$	= Proportion of independent non-executive directors on board (proxy for board composition, %);
$RDUAL$	= 1 if the roles of chairman and CEO are held by the same person; 0 if otherwise;
$SqSCON$	= Square root of cumulative shareholding by significant shareholders (i.e. shareholders holding more than 3% of total shares outstanding to total shares outstanding, %);
SAC	= Audit committee size (total number of directors on the audit committee) (proxy for internal auditing function);
MAC	= Frequency of audit committee meetings (total number of audit committee meetings held within the year to its financial year end) (proxy for internal auditing function);
AGE	= Log of length of listing on LSE (listing age);
ROA	= Return on assets (proxy for firm performance: profitability);
$LnSA$	= Log of sales (proxy for firm size);
β	= parameters;
ε_i	= error term; and
i	= the ith observation.

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[9] This assumption is based on the belief that management has editorial control of content when a large number of demands for inclusion of information are likely to exist. Annual reports are time-consuming and costly to produce, and management must rationalise the competing demands for space. As a result space must be allocated on the basis of some perception of the importance of information to report users.

[10] The standard tests for skewness and kurtosis revealed that share concentration, listing age and firm size were not normally distributed. Appropriate transformations were conducted to ensure data normality. Listing age and firm size were transformed using logarithmic transformation, whereas square root transformation was more effective for share concentration.

Table 1
Measurement of dependent and independent variables

Variable	Proxy	Measurement
Dependent variables		
1 ICDI	Variety of intellectual capital disclosure	Number of items in the research instrument disclosed in the annual report divided by 183
2 ICWC	Volume of intellectual capital disclosure	Total number of words disclosed in relation to intellectual capital information in the annual report
3 ICWC%	Focus of intellectual capital disclosure	Intellectual capital disclosure word count divided by total word count of the annual report
Independent variables		
Corporate governance factors		
1 Board composition	Independent non-executive directors (INED)	Number of independent non-executive directors on board (specified in the annual reports) divided by total number of directors on board
2 Ownership structure	Share concentration (SCON)	Cumulative shareholdings by individuals or organisations classified as substantial shareholders (currently a 3% stake required by the *Companies Act 1985*), with exception of significant directors' shareholding, to the total number of outstanding common shares
3 Internal auditing mechanism	Size of audit committee (SAC)	Number of directors on board in audit committee
4 Internal auditing mechanism	Frequency of audit committee meetings (MAC)	Number of audit committee meetings held within the financial year of the annual report
5 Role duality	Combined role of chairman and CEO (RDUAL)	Dummy variable with a value of 1 if the roles of chairman and CEO are held by the same person
Control variables		
6 Length of listing on LSE	Listing age (AGE)	Number of days listed scaled by 365 days a year
7 Performance: profitability	Return on assets (ROA)	Return/total assets for the financial year of the annual report
8 Firm size	Sales (SA)	Sales revenue of financial year

Table 2 presents the correlation and partial correlation matrices (controlling for log of sales, a proxy for size).[11]

It can be seen from both panel A and B of Table 2 that all variables showed significance for at least one intellectual capital disclosure measure. Table 2, Panel A reveals that, with the exception of log of firm size, independent variable associations are all below 0.30. The VIFs for each independent variable (shown in Table 6) are all less than 2, suggesting that multicollinearity is not a problem.[12] Panel B of Table 2 reveals no multicollinearity among explanatory variables after controlling for size. It can also be seen from Panel B of Table 2 that board composition (INED) shows significant association with all measures of intellectual capital disclosure. Size of audit committee (SAC), fre-

quency of audit committee meetings (MAC), and share concentration (SqSCON), show highly significant (1% and 5% levels) association with ICDI and log of ICWC, but not with ICWC%. Return on assets (ROA) and log of listing age (LnAGE) show significant correlation with ICDI and ICWC% respectively, at the 5% level.

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[11] Due to the significant effect of size on disclosure, the partial correlation (controlling for size) was considered to be more appropriate for identifying the marginal effects of other factors that were significantly correlated to level of intellectual capital disclosure.

[12] Previous authors suggest multicollinearity becomes a serious problem where correlations exceed 0.8 or VIFs exceed 10 (Haniffa and Cooke, 2005). Further, the condition indexes, using eigenvalues of the independent variables correlation matrix, were also acceptable with all being below 20.

Table 2
Correlation and partial correlation (controlling for size effect – sales as a proxy) matrices

Panel A Correlation between dependent and independent variables

	ICDI	LnICWC	ICWC%	INED	SAC	MAC	SqSCON	LnAGE	ROA	LnSA
ICDI	1.000									
LnICWC	0.856***	1.000								
ICWC%	0.500****	0.565****	1.000							
INED	0.340***	0.411***	0.24**	1.000						
SAC	0.511***	0.585***	0.175*	0.234**	1.000					
MAC	0.498***	0.528***	0.151	0.185*	0.283****	1.000				
SqSCON	-0.442***	-0.443****	-0.22**	-0.173*	-0.167*	-0.179*	1.000			
LnAGE	0.119	0.163	-0.164	0.121	0.265****	0.137	-0.118	1.000		
ROA	0.205**	0.146	0.101	-0.023	0.089	0.071	-0.134	0.216**	1.000	
LnSA	0.704***	0.693***	0.104	0.206**	0.485****	0.510***	-0.399****	0.287***	0.082	1.000

Panel B Partial correlation between dependent and independent variables controlling for size effect

	ICDI	LnICWC	ICWC%	INED	SAC	MAC	SqSCON	LnAGE	ROA
ICDI	1.000								
LnICWC	0.719***	1.000							
ICWC%	0.603****	0.688****	1.000						
INED	0.281***	0.380****	0.225**	1.000					
SAC	0.273***	0.394****	0.143	0.157	1.000				
MAC	0.228**	0.281***	0.114	0.095	0.047	1.000			
SqSCON	-0.248**	-0.253**	-0.196*	-0.101	0.033	0.031	1.000		
LnAGE	-0.122	-0.052	-0.204**	0.066	0.15	-0.012	-0.004	1.000	
ROA	0.208**	0.123	0.093	-0.041	0.056	0.034	-0.111	0.201**	1.000

*** = significant at .01 level, ** = significant at .05 level, * = significant at .10 level

5. Results

5.1. Descriptive analysis of intellectual capital disclosure

Table 3 presents the results of the descriptive analysis of intellectual capital disclosure by each of the 61 items in the checklist under three categories in various formats. The most frequently disclosed human capital items in text form are number of employees, employee motivation, work-related competence, and other employee features. Other commonly disclosed human capital items include employee relationship, entrepreneurial spirit, development and training, work-related knowledge, employee age, equality, relation, skills, and commitment. Human capital items least disclosed are vocational qualifications, employee productivity and flexibility. In all three formats, the most disclosed structural capital items are business process, technology, R&D, management philosophy, overall infrastructure and distribution network. The strategic importance of customer and supply chain relationships in intellectual capital disclosure is evidenced by the most disclosed items being customers, relationship with suppliers and stakeholders, market presence, customer relationships and market leadership, with over 90% of sampled firms having disclosures of such items.

5.2. Descriptive statistics

Descriptive statistics of each measure of intellectual capital disclosure, at both overall and subcategory levels, and the independent variables for the sample companies are shown in Table 4.

The mean index (ICDI) is 0.36 with slight variation in the variety of human, structural and relational capital disclosure, and the mean aggregate word count (ICWC) is 10,488 words, accounting for 26.3% of the overall annual report word count (ICWC%). ICDI ranges from 0.16 to 0.56; ICWC ranges from 1,234 to 51,430 words and ICWC% ranges from 8.9% to 42.6%.[13]

The rankings of means for human, structural and relational capital disclosure change according to the disclosure measure employed. Structural capital ranks highest (37%) for the disclosure index score, relational capital ranks highest in terms of word count, while structural capital and relational capital are joint highest for focus, each forming 9% of the total annual report word count. In all cases, human capital is in third place, although not far behind the other two. The relational-structural-human ranking for word count (38%, 34% and 28% of total intellectual capital respectively) is consistent with findings from prior intellectual capital disclosure studies (e.g. Guthrie and Petty,

2000; Bozzolan et al., 2003; Goh and Lim, 2004; Vandemaele et al., 2005), demonstrating systematic differences in the level of reporting on intellectual capital elements. If firms focus on the disclosure of those intellectual capital elements that are most value and stakeholder relevant (Vergauwen et al., 2007), relational capital would seem to be most important in this regard.

The means of corporate governance variables for sample firms indicate that less than half of the board in our sample consists of independent non-executive directors (INED). The mean for the cumulative significant shareholdings (excluding significant directors' shareholding) is 30%. The majority (86%) have three or more directors in the audit committee, suggesting compliance with recommended best practice. In addition, the median for the audit committee meeting frequency is four times per year, with 83% of sample companies meeting three or more times during the financial year, in line with the Price Waterhouse (1993) recommendation.

The results for intellectual capital disclosure by the three formats (text, number, graph/picture) are shown in Table 5. It can be seen that human, structural and relational capitals are disclosed in all three forms in the sample annual reports. Only for structural capital in text form do we observe all possible items disclosed. On average, 43 (70%) of the 61 intellectual capital items in the research instrument have text disclosures. This falls to 29% disclosure in numerical form, and 8% in graph/picture form, although one firm had one-third of its intellectual capital disclosure in graph/picture form.

Our results confirm that intellectual capital disclosures are still mainly in text form, in line with previous studies (e.g. Guthrie and Petty, 2000; Brennan, 2001). The extensive use of numerical information in intellectual capital disclosure identified in the study is encouraging, supporting the finding of Sujan and Abeysekera (2007).

5.3. Regression results

Table 6 summarises the multiple regression results for all three intellectual capital disclosure measures.

The first panel reports the multiple regression results for the ICDI model, producing an adjusted R^2 of 62%. With the exception of role duality (RDUAL), all corporate governance factors examined are significant: size of audit committee (SAC) at the 1% level, and board composition (INED), frequency of audit committee meetings (MAC) and square root of share concentration (SqSCON) at the 5% level. Firm size (LnSA) is significant at the 1% level. Results also show positive relationship between ROA and ICDI, while log of listing age (LnAGE) is negatively associated, both signif-

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[13] Given that previous studies have adopted different research instruments, it is not possible to make meaningful comparison.

Table 3
Number of companies disclosing items in the checklist under three formats[14]

Human capital	T	N	GP	Av. WC
Number of employees	100	99	9	101
Employee age	67	95	0	19
Employee diversity	44	13	3	18
Employee equality	92	1	0	79
Employee relationship	99	45	6	307
Employee education	51	0	0	15
Skills/know-how	92	14	5	114
Employee work-related competences	100	53	0	417
Employee work-related knowledge	91	24	0	142
Employee attitudes/behaviour	72	15	15	63
Employee commitments	88	59	0	114
Employee motivation	100	100	12	605
Employee productivity	17	5	0	3
Employee training	78	9	1	45
Vocational qualifications	10	2	0	3
Employee development	95	24	4	404
Employee flexibility	24	9	0	8
Entrepreneurial spirit	96	8	1	125
Employee capabilities	74	2	1	31
Employee teamwork	51	3	9	22
Employee involvement with community	46	19	3	34
Other employee features	100	2	85	276

Relational capital	T	N	GP	Av. WC
Customers	99	82	48	965
Market presence	92	71	26	382
Customer relationships	90	47	15	295
Customer acquisition	78	42	6	116
Customer retention	65	25	4	45
Customer training & education	17	1	1	9
Customer involvement	18	2	1	7
Company image/reputation	65	6	12	46
Company awards	39	2	13	47
Public relation	69	63	11	165
Diffusion & networking	47	12	3	47
Brands	69	19	18	153
Distribution channels	50	20	5	76
Relationship with suppliers	96	81	2	116
Business collaboration	78	49	14	212
Business agreements	59	34	5	198
Favourite contract	64	45	17	237
Research collaboration	22	6	0	26
Marketing	50	21	9	73
Relationship with stakeholders	94	42	23	623
Market leadership	91	35	8	154

Structural capital	T	N	GP	Av. WC
Intellectual property	58	38	5	215
Process	100	78	21	605
Management philosophy	100	21	14	422
Corporate culture	58	1	2	32
Organisation flexibility	40	0	0	17
Organisation structure	89	43	9	455
Organisation learning	33	0	0	26
Research & development	94	63	11	382
Innovation	71	15	15	108
Technology	98	46	21	220
Financial dealings	100	80	5	386
Customer support function	53	21	3	68
Knowledge-based infrastructure	69	14	0	65
Quality management & improvement	82	13	7	87
Accreditation (certificate)	51	7	4	57
Overall infrastructure/capability	97	62	13	272
Networking	63	4	0	23
Distribution network	65	36	12	111

[14] T, N, and GP represents the number of firms providing disclosure in text, numbers and graphs/pictures respectively; and Av. WC represents the average number of words disclosed by the sample firms.

Table 4
Descriptive statistics for dependent and independent variables (untransformed)

	Mean	Median	Min	Max	SD	z-test Skewness	z-test Kurtosis	K-S Lilliefors[15]
Dependent variables								
ICDI	0.36	0.36	0.16	0.56	0.08	0.90	-0.99	0.08
ICWC	10488	8551	1234	51430	8901.2	9.46	12.87	0.19*
ICWC%	0.263	0.259	0.089	0.426	0.072	0.79	-1.06	0.05
HICDI	0.355	0.348	0.212	0.561	0.073	1.50	-0.31	0.07
SICDI	0.371	0.370	0.130	0.574	0.092	0.07	-0.89	0.07
RICDI	0.365	0.349	0.111	0.667	0.122	0.79	-1.14	0.08
HICWC	2945	2558	545	8507	1598.2	3.43	0.98	0.12*
SICWC	3551	2526	466	23648	3467.6	13.32	28.83	0.19*
RICWC	3992	2689	223	29993	4634.6	11.99	23.27	0.24*
HICWC%	0.083	0.080	0.033	0.174	0.026	2.28	0.61	0.08
SICWC%	0.090	0.084	0.026	0.281	0.039	7.27	11.32	0.12*
RICWC%	0.090	0.083	0.020	0.266	0.047	3.42	2.03	0.09
Independent variables								
Corporate governance factors								
Board composition (%) (INED)	0.47	0.50	0.18	0.75	0.13	-0.11	-0.93	0.09
Ownership concentration (%) (SCON)	29.63	26.05	0[16]	79.2	19.55	2.19	-1.43	0.12*
Audit committee size (number) (SAC)	3.46	3	1	7	1.06	–	–	–
Audit committee meeting (number) (MAC)	3.70	4	1	9	1.41	–	–	–
Role duality (RDUAL)	0.09	0	0	1	0.29	–	–	–
Firm-specific factor								
Listing age (AGE) (years)	17.15	10.69	0.45	71.87	16.71	5.99	2.58	0.19*
Profitability (ROA) (%)	4.38	3.66	-9.53	18.67	5.79	0.03	0.54	0.09
Firm size (SA) £m	4036.7	383.1	0.00[17]	39792.2	8782.4	11.15	13.76	0.35*

[15] * significant at the 1% level.
[16] Two companies reported that they had not been notified in accordance with sections 198 to 208 of the *Companies Act 1985* of any member who had a notifiable interest (≥3%) in the share capital of the company. One company only has one significant shareholder, who sits on the board of directors, hence has no significant outside shareholding.
[17] The company is an active trading company focusing on research and development. Although there were no sales recorded during 2004 financial year, contracts were signed.

Table 5
Descriptive statistics for intellectual capital disclosure by category under three formats

Intellectual capital categories	Format	Min	Max	Max possible	Mean	%	SD
Human capital	Text	9	20	22	15.87	72	2.44
	Numbers	3	12	22	6	27	2.11
	Graphs/pictures	0	8	22	1.54	7	1.33
	All	14	37	66	23.41	35	4.82
Structural capital	Text	5	18	18	13.21	73	2.49
	Numbers	1	12	18	5.42	30	2.30
	Graphs/pictures	0	6	18	1.42	8	1.49
	All	7	31	54	20.05	37	4.99
Relational capital	Text	3	20	21	13.52	64	3.33
	Numbers	1	15	21	7.05	34	3.35
	Graphs/pictures	0	10	21	2.41	11	2.43
	All	7	42	63	22.98	36	7.67
Intellectual capital	Text	19	57	61	42.6	70	7.07
	Numbers	7	38	61	17.44	29	6.95
	Graphs/pictures	0	20	61	4.91	8	5.00
	All	29	103	183	66.44	36	15.52

icant at the 5% level.

The second panel reveals that the log of ICWC (LnICWC) regression model, with an adjusted R^2 of 67%, yields even stronger associations than the ICDI model. Results show highly significant (1% level) relationships between LnICWC and four of the five corporate governance factors examined, i.e. INED, SAC, MAC and SqSCON. However, unlike the ICDI model, ROA and LnAGE are not significant. LnSA is still significant at the 1% level.

The explanatory power of the ICWC% model is weaker (adjusted R^2 of 11.2%), as shown in the third panel. INED and LnAGE show significant associations at the 5% level, with SqSCON showing a weak relationship (10% level). All other corporate governance factors are insignificant, but in the direction predicted. Neither LnSA nor ROA is related to ICWC%.

Table 7 presents a summary of multiple regression results for each of the three intellectual capital subcategories based on the word count metric: LnHICWC (log of human capital word count); LnSICWC (log of structural capital word count); and LnRICWC (log of relational capital word count).[18]

We observe that the two audit committee variables (SAC and MAC) are significantly associated with all three intellectual capital subcategories, confirming our hypothesis of the role these committees play in influencing the level of intellectual

capital disclosure in its various forms. In addition, relational capital disclosures are significantly associated with INED and SqSCON; structural capital disclosures are significantly associated with INED, while human capital disclosures are associated with RDUAL, all in the direction hypothesised.

5.4. Examination of hypotheses

Table 8 summarises the associations between the independent variables and intellectual capital disclosure measures, namely, variety (ICDI), volume (ICWC) and focus (ICWC%).

Board composition was expected to be one of the major corporate governance determinants for intellectual capital disclosure. The significant positive results of all three measures of intellectual capital disclosure, especially for variety (5% level) and volume (1% level), support our hypothesis (H1) that the greater the presence of independent non-executive directors on the board, the greater the intellectual capital disclosure. Detailed analysis at item level (not included) reveals that firms with more independent non-executive directors disclose significantly more human capital items (e.g. employee relations and work-related competence, but not diversity or equality), structural capital items (e.g. management philosophy, corporate culture, innovation, knowledge-based infrastructure, and quality management and improvement), and relational capital items (e.g. market presence, relationships with suppliers, business agreements, and marketing issues). They offer support to arguments based on both agency and resource dependence theories.

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[18] The ICDI models for each of the three intellectual capital subcategories reveals broadly similar associations and are not therefore presented.

Table 6
Multiple regression results for ICDI, LnICWC and ICWC%

	VIF	ICDI					LnICWC					ICWC%				
		Unstandardised coefficients		Standardised coefficients			Unstandardised coefficients		Standardised coefficients			Unstandardised coefficients		Standardised coefficients		
		B	Std. error	Beta	t	Sig.	B	Std. error	Beta	t	Sig.	B	Std. error	Beta	t	Sig.
(Constant)		0.181	0.034		5.402	0.000	7.155	0.275		26.053	0.000	0.234	0.045		5.254	0.000
SAC	1.381	0.016	0.006	0.205	2.805	0.006	0.200	0.047	0.291	4.275	0.000	0.011	0.008	0.162	1.460	0.148
MAC	1.374	0.009	0.004	0.156	2.142	0.035	0.101	0.035	0.195	2.883	0.005	0.005	0.006	0.098	0.882	0.380
INED	1.104	0.106	0.043	0.160	2.456	0.016	1.225	0.354	0.211	3.465	0.001	0.115	0.057	0.200	2.010	0.047
SqSCON	1.242	-0.007	0.003	-0.162	-2.343	0.021	-0.063	0.024	-0.170	-2.633	0.010	-0.007	0.004	-0.180	-1.702	0.092
RDUAL	1.084	-0.013	0.019	-0.045	-0.702	0.484	-0.229	0.152	-0.090	-1.501	0.137	-0.010	0.025	-0.040	-0.407	0.685
LnAGE	1.183	-0.012	0.005	-0.155	-2.295	0.024	-0.064	0.041	-0.098	-1.552	0.124	-0.017	0.007	-0.268	-2.602	0.011
ROA	1.084	0.002	0.001	0.149	2.309	0.023	0.009	0.008	0.071	1.171	0.245	0.002	0.001	0.119	1.212	0.229
LnSA	1.916	0.015	0.003	0.451	5.245	0.000	0.105	0.024	0.347	4.340	0.000	-0.002	0.004	-0.077	-0.590	0.556
R^2				0.649					0.696					0.184		
Adj. R^2				0.618					0.669					0.112		
Std. error				0.051					0.418					0.068		
F value				21.033					26.005					2.568		
Sig. F				0.000					0.000					0.014		

Table 7
Multiple regression results for human, structural and relational capital disclosure based on word count

	VIF	LnHICWC t	LnHICWC Sig.	LnSICWC t	LnSICWC Sig.	LnRICWC t	LnRICWC Sig.
(Constant)		28.717	0.000	16.177	0.000	14.041	0.000
SAC	1.381	5.121	0.000	2.924	0.004	3.437	0.001
MAC	1.374	2.497	0.014	2.482	0.015	2.326	0.022
INED	1.104	1.538	0.128	3.239	0.002	2.785	0.007
SqSCON	1.242	−1.299	0.197	−1.647	0.103	−3.272	0.002
RDUAL	1.084	−2.030	0.045	−0.787	0.433	−1.067	0.289
LnAGE	1.183	−2.111	0.038	−0.116	0.908	−2.045	0.044
ROA	1.084	0.502	0.617	0.939	0.350	1.532	0.129
LnSA	1.916	5.040	0.000	2.449	0.016	3.728	0.000
R^2		0.685		0.536		0.633	
Adj. R^2		0.657		0.495		0.601	
Std. error		0.339		0.554		0.631	
F value		24.733		13.153		19.625	
Sig. F		0.000		0.000		0.000	

Table 8
Summary of multiple regression results

Hypotheses	Predicted sign	Actual sign	Hypothesis support ICDI (variety)	Hypothesis support LnICWC (volume)	Hypothesis support ICWC % (focus)
Board composition (H1)	+	+	Moderate	Strong	Moderate
Role duality (H2)	−	−	None	None	None
Share concentration (H3)	−	−	Moderate	Strong	Weak
Audit committee size (H4)	+	+	Strong	Strong	None
Frequency of audit committee meetings (H5)	+	+	Moderate	Strong	None
Listing age	−	−	Moderate	None	Moderate
ROA	+	+	Moderate	None	None
Sales	+	+	Strong	Strong	None

Strong = significant at .01 level, Moderate = significant at .05 level, Weak = significant at .10 level

Role duality was not found to influence intellectual capital disclosure and our hypothesis (H2) was rejected. Share ownership concentration showed significant negative associations with all three measures of intellectual capital disclosure as hypothesised, especially by variety (5% level) and volume (1% level). The finding supports our hypothesis (H3) that companies with more concentrated share ownership are less responsive to investors' information costs, since the dominant shareholders typically have regular access to the information they require and hence there is less pressure for intellectual capital disclosure in annual reports. Analysis at intellectual capital subcategory level reveals that the impact of block shareholders is mainly on the volume of relational capital disclosure (e.g. customers, market presence and leadership, customer relationship and acquisition, company awards, public relation, distribution channel, relationship with suppliers and stakeholders, business collaboration and marketing).

Audit committee size was found to be positively

associated with ICDI and LnICWC, supporting our hypothesis (H4) that companies with larger audit committees tend to provide greater intellectual capital disclosure in their annual reports. This is in line with the recommendations of the Smith Report (2003) that audit committees have responsibility to oversee documents such as the operating and financial review. This document typically has a strong intellectual capital disclosure emphasis. Results support hypothesis (H5) that a positive relationship exists between level of intellectual capital disclosure and frequency of audit committee meetings. This suggests that audit committee activity is an important factor in monitoring management behaviour with regard to reducing information asymmetry through intellectual capital disclosure.

6. Summary and conclusions

Results based on multiple regression models for the three intellectual capital disclosure measures indicate that, with the exception of role duality, all corporate governance variables together with firm size, profitability and listing age are associated with one or more of the intellectual capital disclosure measures. This is consistent with Keenan and Aggestam's (2001) argument, previously untested, that corporate governance impacts on efficient intellectual capital management, including its communication to stakeholders. The significant positive association for board composition provides evidence for independent directors' function as a monitoring mechanism, which enhances the effectiveness of the board and reduces both agency costs and information asymmetries between principals and agents. Moreover, their breadth of expertise and knowledge heighten the board's awareness of the importance of intellectual capital disclosure, especially structural and relational capital. We also find confirmation of our share concentration, audit committee size and frequency of audit committee meetings hypotheses, under-

pinned by agency theory arguments. Where share ownership is highly concentrated, smaller shareholders' interests in relation to intellectual capital need to be protected via corporate governance mechanisms, such as greater independence of the board and larger, more active audit committees for better intellectual capital communication.

We argue that, as well as the variety and volume of disclosure, it is meaningful to measure each firm's disclosure focus (ICWC%) to examine the proportion of annual reports devoted to intellectual capital. On average, 26% of annual report disclosures were devoted to intellectual capital; this focus is not size dependent and is greater where firms have a higher proportion of independent non-executive directors and shareholdings are more widely spread.

Our findings indicate that, in the absence of mandatory disclosure, effective corporate governance mechanisms impact positively on the variety, volume (word count) and format (text, numbers, graphs/pictures) of intellectual capital disclosure. Future research could usefully explore the relationships identified in the study in greater depth through organisational case studies.

There are several limitations in this study. First, the disclosure scoring sheet is self-developed, which causes difficulty for comparison with prior studies. Second, the study focuses only on corporate annual reports and future studies may consider other media. Third, there will be other factors that affect companies' intellectual capital disclosure practices that have not been examined in this study.[19] Finally, the study has not attempted to include corporate culture. For example, companies that choose to have good disclosure policies may also choose to operate good corporate governance practices.

References

Abeysekera, I. (2006). 'The Project of Intellectual Capital Disclosure: Researching the Research', *Journal of Intellectual Capital*, 7 (1): 61–77.

Abeysekera, I., and Guthrie, J. (2005). 'An Empirical Investigation of Annual Reporting Trends of Intellectual Capital in Sri Lanka', *Critical Perspectives in Accounting*, 16 (3): 151–163.

Aboody, D. and Lev, B. (1998). 'The Value relevance of Intangibles: The Case of Software Capitalization', *Journal of Accounting Research*, 36 (Supplement): 161–191.

Accounting Standards Board (ASB) (2007). *A Review of Narrative Reporting by UK Listed Companies in 2006*, FRC. URL: http://www.frc.org.uk/asb/press/pub1228.html, accessed 15/01/2007.

Amir, E., and Lev, B. (1996). 'Value-Relevance of Nonfinancial Information: The Wireless Communication Industry', *Journal of Accounting and Economics*, 22 (1–3): 3–30.

Barnes, E., and Walker, M. (2006). 'The Seasoned-Equity Issues of UK Firms: Market Reaction and Issuance Method Choice', *Journal of Business Finance and*

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[19] As with any disclosure study, the problem of endogeneity may exist where corporate governance variables are themselves included in intellectual capital disclosure. For example, increasing the number of independent non-executive directors in relation to executive directors could increase the amount of information on current positions held outside the company by directors available for disclosure. However, this is compensated by the expectation of a reduction in the amount of information about employee relationships (executive directors' years of service), employee development (career path of executive directors in the company), and management capability (executive directors' leadership abilities). As shown in Table 7, by breaking intellectual capital disclosure down to its subcategories, board composition does not have a significant effect on the volume of human capital disclosure, while there are significant effects on the volume of relational and structural capital disclosures. The problem of endogeneity in this study is not considered significant.

Accounting, 33 (1/2): 45–78.

Barth, M.E., Kasznik, R., and McNichols, M. (2001). 'Analyst Coverage and Intangible Assets', *Journal of Accounting Research*, 39 (1): 1–34.

Beasley, M. (1996). 'An Empirical Analysis of the Relation between the Board of Director Composition and Financial Statement Fraud', *Accounting Review*, 71 (4): 443–465.

Beattie, V., and Thomson, S. J. (2007). 'Lifting the Lid on the Use of Content Analysis to Investigate Intellectual Capital Disclosures', *Accounting Forum*, 31 (2): 129–163.

Beattie, V., McInnes, B., and Fearnley, S. (2002). *Through the Eyes of Management: A Study of Narrative Disclosures*, Institute of Chartered Accountants in England and Wales (ICAEW), Milton Keynes.

Blackburn, V. (1994). 'The Effectiveness of Corporate Control in the US Corporations', *Corporate Governance: An International Review*, 2: 196.

Bontis, N. (1998). 'Intellectual Capital: An Exploratory Study that Develops Measures and Models', *Management Decision*, 36 (2): 63–76.

Bontis, N. (2003). 'Intellectual Capital Disclosure in Canadian Corporations', *Journal of Human Resource Costing and Accounting*, 7 (1/2): 9–20.

Bozzolan, S., Favotto, F., and Ricceri, F. (2003). 'Italian Annual Intellectual Capital Disclosure: An Empirical Analysis', *Journal of Intellectual Capital*, 4 (4): 543–558.

Brammer, S., and Pavelin, S. (2006). 'Voluntary Environmental Disclosures by Large UK Companies', *Journal of Business Finance and Accounting*, 33 (7/8): 1168–1188.

Brennan, N. (2001). 'Reporting Intellectual Capital in Annual Reports: Evidence from Ireland', *Accounting, Auditing & Accountability Journal*, 14 (4): 423–436.

Brooking, A. (1996). *Intellectual Capital, Core Assets for the Third Millennium Enterprise*, London: International Thomson Business Press.

Bukh, P. N. (2003). 'Commentary: The Relevance of Intellectual Capital Disclosure: A Paradox?', *Accounting, Auditing & Accountability Journal*, 16 (1): 49–56.

Cañibano, L., García -Ayuso, M., and Sanchez, P. (2000). 'Accounting for Intangibles: A Literature Review', *Journal of Accounting Literature*, 19: 102–130.

Cerbioni, F., and Parbonetti, A. (2007). 'Exploring the Effects of Corporate Governance on Intellectual Capital Disclosure: An Analysis of European Biotechnology Companies', *European Accounting Review*, 16 (4): 791–826.

Chaminade, C., and Roberts, H. (2003). 'What It Means Is What It Does: A Comparative Analysis of Implementing Intellectual Capital in Norway and Spain', *European Accounting Review*, 12 (4): 733–751.

Chen, C. J. P., and Jaggi, B. (2000). 'Association between Independent Non-Executive Directors, Family Control and Financial Disclosure in Hong Kong', *Journal of Accounting and Public Policy*, 19 (4–5): 285–310.

CIMA (2001). *Managing the Intellectual Capital within Today's Knowledge-based Organisations*, September, Technical Briefing.

Combined Code on Corporate Governance (2006). London: Financial Reporting Council Ltd.

Cooke, T. E. (1989). 'Voluntary Corporate Disclosure by Swedish Companies', *Journal of International Financial Management and Accounting*, 1 (2): 1–25.

Cormier, D., Magnan, M., and van Velthoven, B. (2005). 'Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions?' *European Accounting Review*, 14 (1): 3–39.

Cotter, J., and Silvester, M. (2003). 'Board and Monitoring

Committee Independence', *Abacus*, 39 (2): 211–232.

Eng, L. L., and Mak, Y. T. (2003). 'Corporate Governance and Voluntary Disclosure', *Journal of Accounting and Public Policy*, 22 (4): 325–345.

Financial Accounting Standards Board (FASB) (2001). *Improving Business Reporting: Insights into Enhancing Voluntary Disclosure,* Business Reporting Research Project, Steering Committee Report, Financial Accounting Standards Board.

Forker, J. J. (1992). 'Corporate Governance and Disclosure Quality', *Accounting and Business Research*, 22 (86): 111–124.

García-Meca, E., and Martínez, I. (2005). 'Assessing the Quality of Disclosure on Intangibles in the Spanish Capital Market', *European Business Review*, 17 (4): 305–313.

García-Meca, E., Larrán, M., and Martínez, I. (2005). 'The Explanatory Factors of Intellectual Capital Disclosure to Financial Analysts', *European Accounting Review*, 14 (1): 63–94.

Gibbins, M., Richardson, A., and Waterhouse, J. (1990). 'The Management of Corporate Financial Disclosure: Opportunism, Ritualism, Policies and Processes', *Journal of Accounting Research*, 28 (1): 121–143.

Goh, P. C., and Lim K. P. (2004). 'Disclosing Intellectual Capital in Company Annual Reports: Evidence from Malaysia', *Journal of Intellectual Capital*, 5 (3): 500–510.

Guthrie, J., and Petty, R. (2000). 'Intellectual Capital: Australian Annual Reporting Practices', *Journal of Intellectual Capital*, 1 (3): 241–251.

Habersam, M., and Piper, M. (2003). 'Exploring Intellectual Capital in Hospitals: Two Qualitative Case Studies in Italy and Austria', *European Accounting Review*, 12 (4): 753–779.

Haniffa, M. R., and Cooke, T. E. (2002). 'Culture, Corporate Governance and Disclosure in Malaysian Corporations', *Abacus*, 38 (3): 317–349.

Haniffa, M. R., and Cooke, T. E. (2005). 'The Impact of Culture and Governance on Corporate Social Reporting', *Journal of Accounting and Public Policy*, 24: 391–430.

Ho, S. S. M., and Wong, K. S. (2001). 'A Study of the Relationship Between Corporate Governance Structures and the Extent of Voluntary Disclosure', *Journal of International Accounting, Auditing and Taxation*, 10 (2): 139–156.

Holland, J. (2006a). *A Model of Corporate Financial Communication*, Institute of Chartered Accountants of Scotland (ICAS): Edinburgh.

Holland, J. (2006b). 'Fund Management, Intellectual Capital, Intangibles and Private Disclosure', *Managerial Finance*, 32 (4): 277–316.

Ittner, C. and Larcker, D. (1998). 'Are Non-Financial Measures Leading Indicators of Financial Performance? An Analyst Satisfaction Survey', *Journal of Accounting Research*, 36 (Supplement): 1–35.

Jensen, M. C., and Meckling, W. H. (1976). 'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure', *Journal of Financial Economics*, 3: 305–360.

Keenan, J., and Aggestam, M. (2001). 'Corporate Governance and Intellectual Capital: Some Conceptualisations', *Corporate Governance*, 9 (4): 259–275.

Krippendorff, K. (1980). *Content Analysis: An Introduction to Its Methodology*, Beverly Hills, CA: Sage.

Lev, B. (2001). *Intangibles: Management, Measurement and Reporting*, Washington: The Brookings Institution.

Lev, B., and Zarowin, P. (1999). 'The Boundaries of Financial Reporting and How to Extend Them', *Journal of Accounting Research*, 37 (2): 353–386.

Mangena, M., and Pike, R. (2005). 'The Effect of Audit Committee Shareholding, Financial Expertise and Size on Interim Financial Disclosures', *Accounting and Business Research*, 35 (4): 327–349.

McMullen, D. A. (1996). 'Audit Committee Performance: An Investigation of the Consequences Associated with Audit Committees', *Auditing: A Journal of Practice and Theory*, 15 (1): 87–103.

Meritum (2002). *Guidelines for Managing and Reporting on Intangibles*, Madrid.

Milne, M., and Adler, R. (1999). 'Exploring the Reliability of Social and Environmental Disclosures Content Analysis', *Accounting, Auditing & Accountability Journal*, 12 (2): 237–256.

Moser, C. A., and Kalton, G. (1996). *Survey Methods in Social Investigation*, Great Yarmouth: Galliard Printers.

Mouritsen, J. (1998). 'Driving Growth: Economic Value versus Intellectual Capital', *Management Accounting Research*, 9 (4): 461–482.

Mouritsen, J., Larsen, H. T., and Bukh, P. N. D. (2001). 'Intellectual Capital and the 'Capable Firm': Narrating, Visualising and Numbering for Managing Knowledge', *Accounting, Organisation and Society*, 26.

Olson, J. (1999). 'How to Make Audit Committees More Effective', *Business Lawyer*, 54: 1097–1113.

Parker, L. D. (2007). 'Financial and External Reporting Research: The Broadening Corporate Governance Challenge', *Accounting and Business Research*, 37 (1): 39–54.

Patelli, L., and Prencipe, A. (2007). 'The Relationship between Voluntary Disclosure and Independent Directors in the Presence of A Dominant Shareholder', *European Accounting Review*, 16 (1): 5–33.

Price Waterhouse (1993). *Improving Audit Committee Performance: What Works Best*. Altamonte Springs, FL: Institute of Internal Auditors Research Foundation.

Raffournier, B. (1995). 'The Determinants of Voluntary Financial Disclosure by Swiss Listed Companies', *European Accounting Review*, 4 (2): 261–280.

Riffe, D., Lacy, S., and Fico, F.G. (2005). *Analyzing Media Messages: Using Quantitative Content Analysis in Research*, 2nd edn, Mahwah, NJ: Lawrence Erlbaum.

Rodgers, W. (2003). 'Measurement and Reporting of Knowledge-based Assets', *Journal of Intellectual Capital*, 4 (2): 181–190.

Roslender, R., and Fincham, R. (2004). 'Intellectual Capital Accounting in the UK: A Field Study Perspective', *Accounting, Auditing & Accountability Journal*, 17 (2): 178–209.

Smith Report (2003). *Audit Committees: Combined Code*

Guidance, London: Financial Reporting Council. URL: www.frc.org.uk/publications.

Smith, J. L., Adhihari, A., and Tondkar, R. H. (2005). 'Exploring Differences in Social Disclosures Internationally: A Stakeholder Perspective', *Journal of Accounting and Public Policy*, 24 (2): 123–151.

Stewart, T. A. (1997). *Intellectual Capital – The New Wealth of Organizations*, London: Nicholas Brealey.

Subbarao, A. V., and Zeghal, D. (1997). 'Human Resources Information Disclosure in Annual Reports: An International Comparison', *Journal of Human Resource Costing and Accounting*, 2 (2): 53–73.

Sujan, A. and Abeysekera, I. (2007). 'Intellectual Capital Reporting Practices of the Top Australian Firms', *Australian Accounting Review*, 17 (2): 71–83.

Sveiby, K. E. (1997). *The New Organisational Wealth: Managing and Measuring Knowledge-based Assets*, San Francisco, CA: Berrett-Koehler Publishers.

Tayles, M., Pike, R., and Sofian, S. (2007) 'Intellectual Capital, Management Accounting Practices and Corporate Performance: Perceptions of Managers', *Accounting, Auditing & Accountability Journal*, 20(4): 522.

Vandemaele, S. N., Vergauwen, P. G. M. C., and Smits A. J. (2005). 'Intellectual Capital Disclosure in the Netherlands, Sweden and the UK: A Longitudinal and Comparative Study', *Journal of Intellectual Capital*, 6 (3): 417–426.

Vergauwen, P. G. M. C., and van Alem, F. J. C. (2005). 'Annual report IC disclosure in the Netherlands, France and Germany', *Journal of Intellectual Capital*, 6 (1): 89–104.

Vergauwen, P., Bollen, L, and Oirbans, E. (2007). 'Intellectual Capital Disclosure and Intangible Value Drivers: An Empirical Study', *Journal of Intellectual Capital*, 45 (7): 1163–1180.

Weimer, J. and Pape, J. (1999). A Taxonomy of Systems of Corporate Governance, *Corporate Governance: An International Review*, 7 (2): 152–166.

Welker, M. (1995). 'Disclosure Policy, Information Asymmetry and Liquidity in Equity Markets', *Contemporary Accounting Research*, 11: 801–828.

Williams, M. S. (2001). 'Are Intellectual Capital Performance and Disclosure Practices Related?' *Journal of Intellectual Capital*, 2 (3): 192–203.

Zeghal, D., and Ahmed, S. (1990). 'Comparison of Social Responsibility Information Disclosure Media Used by Canadian Firms', *Accounting, Auditing & Accountability Journal*, 3 (1): 38–53.

Appendix
Definition and nature of information

Human capital

1	Number of employees	Employee count of a firm, employee breakdown by, e.g. market (business operation or geographical segments), department and job function, and information about its changes and reasons for such changes.
2	Employee age	Biological age of employees in the firm. Includes qualitative description of age-related advantages/strengths of a company's employees, and indicators such as average age of a company's employees and age distribution.
3	Employee diversity	Diversity is defined as the division of classes among a certain population. The item refers to the mix of, e.g. ethnicity, gender, colour, and sexual orientation. Relevant disclosures include employee diversity policy, the mix and breakdown of employee by race, religion, and culture.
4	Employee equality	Equal treatment of people irrespective of social and cultural differences. Related disclosures include employee equality policy and initiatives taken for enforcement, senior management by gender, and percentage of disabled employees.
5	Employee relationship	The recognition of importance of employees, employee appreciation, dependence on key employees, employee satisfaction, loyalty, Health & Safety and working environment. It also includes initiatives to build and improve employee relationship, e.g. trade union activities, promotion in share ownership and employee contractual relationships.
6	Employee education	Education of directors as well as other employees. Employees' professional recognition is classified under employee work-related competences.
7	Skills/know-how	Disclosures can be description of knowledge, know-how, expertise or skills of directors and other employees. Matrices could also be shown indicating number of employees with such skills, etc.
8	Employee work-related competences	The knowledge and skills that can be useful to accomplish jobs. It refers to, e.g. current positions held outside the company by directors, professional recognition/qualification, awards won (external), and employee publications.
9	Employee work-related knowledge	What is acquired during the job in terms of tacit, explicit and implicit knowledge. It mainly relates to knowledge that employees have related to their current job description, including employees' previous working experiences.
10	Employee attitudes/ behaviour	It reflects how employees are working. Relevant disclosures could be, e.g. employee friendliness, welcoming, hard working, optimism, enthusiasm, and identification of individuals with company's goals.
11	Employee commitments	It refers to employees being bound emotionally/intellectually to the organisation. It covers, e.g. description of employee commitments, employee commitment matrix/index, and indicators such as attendance of meetings.
12	Employee motivation	Policies, initiatives and evidence of motivation of directors and other employees. It includes reward (internal) and incentives systems, e.g. employee explicit recognition, performance/psychometric/occupational assessment, and indicators of such as employee turnover,[20] stability, absence, and seniority.
13	Employee productivity[21]	It is typically measured as output per employee or output per labour-hour, an output which could be measured in physical terms or in price terms. It shows the value added and efficiency of employees. Indicators include, e.g. employee value added, revenue or customers per employee.

[20] Information about directors' retirement is not included as employee turnover.
[21] Directors' achievements based on incentive schemes are classified as employee motivation information rather than employee productivity. It is considered more appropriate to reflect on the motivational effectiveness of incentive schemes.

Appendix
Definition and nature of information *(continued)*

14	Employee training	It includes, e.g. training policies, training programmes, training time, attendance, investment in training, number of employees trained per period, and training results/effectiveness/efficiency.
15	Vocational qualifications	It refers to education, managed and monitored by trade and professional organisations (Brooking, 1996), received by an employee for a particular vocation that proves the skill, knowledge and understanding he/she has to do a job well.
16	Employee development[22]	Employee career development. Disclosures include employee development policies and programmes (e.g. succession planning), recruitment policies (e.g. internal promotion). Indicators include change of employee seniority, and rate of internal promotion.
17	Employee flexibility	Strategies used by employers to adapt the work of employees to their production/business cycles; and a method to enable workers to adjust working life and working hours to their own preferences. For example, temporary/fixed-term contracts, relaxed hiring and firing regulations, adjustable working hours or schedules (e.g. part-time, flexible working hours/shifts, working time accounts, leave, and overtime), outsourcing, job rotation, tele/home-workers, outworkers.
18	Entrepreneurial spirit	It refers to, e.g. employee engagement (e.g. employee suggestion systems/ consultations, rate of employee suggestions acceptance), empowerment (responsibility taking), creativity (e.g. valuing creativity, tolerance of creative people), innovativeness, knowledge sharing, and employee proactive/reactive ability.
19	Employee capabilities	Other employee abilities apart from the above discussed, e.g. communication ability, interpersonal ability, sensitivity (e.g. thoughtful), reflexibility, and management quality.
20	Employee teamwork	Teamwork is the concept of people working together cooperatively. It covers information about culture of teamwork (expert teams and networks, teamwork capacity), programmes that enhance relationships between employees within/ across departments.
21	Employee involvement with community	Employee social competence can be reflected by their involvement with community. It is defined as providing employees opportunities for contact with an often concealed but significant part of the firm's stakeholders.
22	Other employee features	It refers to the special display or attraction of, or gives special prominence to, employees of the firm, e.g. photographs of employees, other employee profile information (e.g. positions held).

Structural capital

1	Intellectual property	It is a term that encompasses patents, copyrights, trademarks, trade secrets, licenses, commercial rights and other related fields. It covers the assets of a company which is protected by law.
2	Process	It normally refers to a company's management (sales tools, company co-operation forms, corporate specialisation, operational or administrative processes). It includes utilisation of organisation resources, processes/ procedures / routines, and documentations which enables the company or employees to follow. Indicators are, e.g. efficiency, effectiveness, and productivity.
3	Management philosophy	'The way leaders in the firm think about the firm and its employees' (Brooking, 1996: 62), i.e. the way a firm's managed.

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[22] Not formal qualifications as degrees.

Appendix
Definition and nature of information *(continued)*

4	Corporate culture	The set of key values, beliefs, attitudes and understanding shared by people and groups in an organisation, which controls the way members of the organisation interact with each other and with other stakeholders. It covers information about, e.g. description of the firm's corporate culture and value, stories and myths that build up about people, events and history conveying a message about what is valued within a firm.
5	Organisation flexibility	A company's ability to face challenges and changes, such as specific processes firms use to alter their resource base.
6	Organisation structure	Reporting lines, hierarchies, and the way that work flows through the business, including management structure and business models.
7	Organisation learning	A characteristic of an adaptive organisation. It covers what firms learn from experience and incorporate the learning as feedback into their planning process.
8	Research & development (R&D)	It refers to future-oriented, longer-term activities in business practice, which can achieve higher levels of knowledge and improvement in business practice, allowing the organisation to exploit competitive advantages. It includes, e.g. R&D policies, programmes, planning, progress, budgets, successful rate, rate of peer-reviewed publications.
9	Innovation	Defined as the successful implementation of creative ideas within a firm by introducing something new and useful (radical or incremental changes to products, processes or services).
10	Technology	A collection of techniques, which is the current state of humanity's knowledge of how to combine resources to produce desired products, to solve problems, fulfil needs, or satisfy wants. It includes machines, IT (e.g. computer hardware and software), IS (e.g. SAP, PeopleSoft, database), technical methods, and techniques.
11	Financial dealings	Defined as the favourable relationships the firm has with investors, banks and other financiers, financial ratings, financial facilities available, and listings.
12	Customer support function	Functions for customer support, such as customer support centres (e.g. call centres) and other related activities and programmes.
13	Knowledge-based infrastructure	It includes, e.g. documented materials (e.g. shared database) that a firm shares amongst employees, facilities or centres (knowledge centres, laboratories) for training & learning, and knowledge management and sharing programmes/policies/facilities.
14	Quality management & improvement	Practices in maintaining and improving quality standards of products and services. Information considered relevant includes, e.g. policies and objectives, programmes, control activities (e.g. TQM), description of quality performance, and existence of quality committee.
15	Accreditations (certificate)	A process in which certification of competency, authority, or credibility is presented. It has been broadly referred to as quality certificates. 'Investor in people' accreditation represents a firm's commitment to its employees; hence classified under employee relationship.
16	Overall infrastructure/ capability	Infrastructure/capabilities of a firm that cannot be classified under the other 17 structural capital items. Where acquisitions are stated to add a firm's capability of products and services provision, such information is included under this item.
17	Networking	The systems available in a firm that allows interaction of people via a broad array of communication media and devices, e.g. voicemail, e-mail, voice or video conferencing, the internet, groupware and corporate intranets, personal digital assistants, and newsletters.

Appendix
Definition and nature of information *(continued)*

18	Distribution network	Internal networks of distribution, such as distribution centres. It is what a company owns and forms a very essential part of the business supply chain.

Relational capital

1	Customers	General customer information, e.g. type of customers, customer names, reputation of customers, customer base, knowledge of markets/customers, and customer purchasing histories.
2	Market presence	It covers target markets of a firm, geographically or by market segmentation, percentage of sales represented by each market segment, and market share.
3	Customer relationships	It includes policies and programmes for building customer relationships (e.g. customer loyalty schemes, customer satisfaction survey and the initiatives taken for improvement, complaints management), current relationships with customers (e.g. customer satisfaction and loyalty, customer recommendation, recognition of dependence on key customers, customer perception (e.g. expressed by direct quotes), and various activities/indicators that enhance customer relationships, such as on-time deliveries, convenience of returning goods, value for money).
4	Customer acquisition	It refers to a company's new customers/contracts (unless identified as favourite contracts). It also includes a company's effort on acquiring new or more customers, such as investments/costs.
5	Customer retention	It focuses on retaining the existing customers. Relevant information includes e.g. the number of repeated customers/contracts, renewed contracts, backlog orders, and customer repurchase.
6	CTE	Customer training & education (CTE), such as presentation, road shows, exhibitions, etc.
7	Customer involvement	It focuses on customer consultation on product or services development, which could also include customer and company connectivity.
8	Company image/ reputation	It refers to the evaluation/perception of a firm by its stakeholders in terms of their effect, esteem, and knowledge, and what a company stand for.
9	Company awards	It includes awards to a company which is not specifically to other aspects, such as innovation or employees.
10	Public relation	It is the managing of outside communication of an organisation to create and maintain a positive image. Public relations involve, e.g. popularising successes and downplaying failures.
11	Diffusion & networking	It includes taking part in social events, courses, conferences, lectures, or other presentations or seminars.
12	Brands[23]	Information about, e.g. brand names, brand images, brand awareness, brand loyalty (e.g. word of mouth advocacy), brand-building strategies and activities, and brand-related sales.
13	Distribution channels	Defined as appropriate mechanisms of getting products and services into the market (Brooking, 1996). It refers to various third party distribution channels, e.g. distributors, agents, dealers.
14	Relationship with suppliers	It includes, e.g. knowledge of suppliers, relationships with them (such as reliance on key suppliers, bargaining power against suppliers, support of suppliers, and payment terms).

[23] Brands have been classified under relational capital in various studies (e.g. Bozzolan et al., 2003; Brennan, 2001; Guthrie and Petty, 2000). Although authors such as Rodgers (2003) consider brands as a structural capital item, it is considered in this study that brands themselves are not able to create value for firms and it is the attachment of the market and customers, and the positive perception consumers have relating to the brand that lead to purchase decisions and add value to the firm.

Appendix
Definition and nature of information *(continued)*

15	Business collaboration	Collaborations established with other business partners. It covers issues such as strategic alliances, joint venture and partnership for the purpose of working together to improve effectiveness and efficiency by combining each other's advantages.
16	Business agreements	It includes such as licensing and franchising agreements. However, the transactions are not within a consolidated group of companies.
17	Favourite contract	A contract obtained because of the unique market position held by the firm (Brooking, 1996). It includes description of the contract and the favourable relationships.
18	Research collaboration	Collaborations with scientific associations or institutions (e.g. schools and universities) for research or development purposes for the benefit of the company or the community.
19	Marketing	It includes, e.g. marketing initiatives, investments, strategies, capabilities, and effects (e.g. awareness raised or sales created).
20	Relationship with stakeholders	A firm's relationship with stakeholders, which cannot be covered by relationship with customers, suppliers and shareholders, e.g. community, government, and competitors.
21	Market leadership	A firm's leadership in various markets or top positions. Market share supplementing market leadership statement is also included.

Book Reviews

Editor's note:

George J. Benston

The following review was written prior to the sad news of the death of Professor George J. Benston in February 2008. He was the John H. Harland Professor of Finance at Goizueta Business School, Emory University and an Honorary Visiting Professor at City University, London. He had previously been a faculty member at the universities of Rochester and Chicago. He has also held visiting professorships at the University of Oxford, the London School of Economics and the London Graduate School of Business Studies. Professor Benston's research spanned finance, banking and accounting. In a note of remembrance the Dean of the Goizueta Business School remarked on Benston's advocacy of fairness and quality in the worlds of finance and banking and on the outspoken views on accounting standards and the role and responsibilities of government, which he shared with colleagues in discussion. The book reviewed here shares those views with a wider audience.

Worldwide Financial Reporting – The Development and Future of Accounting Standards. *George J. Benston, Michael Bromwich, Robert E. Litan* and *Alfred Wagenhofer*. Oxford University Press (USA), 2006, vi and 326 pp. ISBN13: 978-0-19-530583-8. £26.99.

At the time when most countries have adopted, or intend to adopt, the same set of accounting standards, the book by Benston et al. is somewhat provocative. It seems to be organised with the goal of demonstrating that, contrary to what is generally and perhaps too quickly assumed, the current trend in the standardisation of financial reporting practices is not systematically desirable. The authors' demonstration is structured into three steps. Chapters 1 to 3 focus on the roles of audited financial statements in an economy where firms obtain financing from capital markets. They provide a basis for examining the financial reporting environment in five major countries, or set of countries: the United States (chapter 4), the United Kingdom (chapter 5), Germany (chapter 6), the European Union (chapter 7), and Japan (chapter 8). Based on the diversity of financial reporting regimes put forward in these five chapters, chapters 9 to 11 question the necessity of imposing all firms to comply with a unique set of financial reporting standards, established by a single standard-setting body.

Designed as an introductory chapter, chapter 1 describes the recent trends in equity markets. It provides various data on changes in market capitalisations, in cross-border capital flows, and in the proportion of shares owned by individuals over the last decades. It asserts that the rapid growth and integration of equity markets results in increased demand for relevant, reliable and timely information useful for investment decisions. Chapter 2 analyses the usefulness of financial statements, notably for non-controlling investors who have no other mean to evaluate managers and to gauge the financial position of the firm. It briefly discusses several problems inherent to financial accounting, including the appraisal of asset value, the measurement of net income and the potential manipulation of reported figures. Chapter 3 examines the role of auditing and accounting standards in ensuring the trustworthiness of financial statements. It highlights the advantages of principles-based standards, considering that rules-based ones are ineffective and potentially dangerous. They are ineffective because it is not possible to establish rules covering all possible situations. They may be dangerous if they encourage transactions designed to produce misleading accounting figures, while complying with reporting rules. The same chapter outlines the benefits and limitations of private versus government standard setting.

The next five chapters review the regulations governing financial reporting in four major industrialised countries, and in the European Union. They provide rich and concise descriptions of the reporting regimes under study, illustrating the diversity of the environmental factors that determine financial reporting practices. They are undoubtedly useful to understand the origins and characteristics of the current institutional environments in

each country. These five central chapters, each devoted to a specific country, follow almost the same pattern. They start with an overview of the characteristics of each country's financial system. Using an historical perspective, they analyse the current regimes regulating accounting disclosures, auditing, and enforcement mechanisms. Considering the stewardship role of accounting information, they investigate corporate governance and investor protection systems. Interestingly, each chapter concludes with a presentation of current financial reporting issues in each surveyed country, such as the convergence with IFRS in the US, the weak enforcement of corporate governance mechanisms in the UK, the cost of simultaneous compliance with two distinct sets of accounting standards in Germany, the creation of an integrated financial market in the EU and the necessary changes of the regulatory environment it implies.

Providing a synthesis of the five preceding chapters, chapter 9 contrasts the financial reporting regimes in the countries under review. They share common characteristics but, at the same time, they exhibit substantial differences. To sustain growth and competitiveness of their capital markets and to respond to both domestic and international investors' growing needs in information, these countries have all adapted their disclosure regimes continuously. The necessity to reduce costs related to financial statement analysis has led to a strong convergence of accounting rules, but the process has been limited to listed companies. Accounting standards of small and medium-sized firms remain significantly different between countries. The chapter shows that diversity in state governance systems, legal systems, and corporate governance systems, insofar as they determine how information about companies is produced, controlled and disseminated, explains the differences between reporting regimes. They are shaped by a complex nexus of multiple interrelated factors, so that changing one of them 'may destroy an extant subtle balance and result in a reduction of the efficiency of capital markets' (p. 211). Concentrating on the recent convergence of accounting standards, chapter 10 develops this idea. It analyses the costs and benefits of global financial reporting standards, and the advantages of competition among standards. It explains that uniform reporting standards cannot evolve and be sustained in countries that differ strongly with respect to their economies, governance structures, and enforcement systems. Furthermore, instead of improving financial reporting, such uniform standards would even worsen the quality of accounting information. This leads the authors to recommend competition among reporting standards. Companies should be allowed to choose 'among a given set of competing financial accounting standards ... (the

one that) best fits the individual and environmental setting in which they operate.' (p. 241). It is therefore with no surprise that the authors disapprove the convergence of IFRS and US GAAP. The final chapter summarises the book and provides additional analyses on current accounting issues, notably the measurement of net income, the increasing use of fair value, the recognition of intangibles, the respective roles of voluntary and mandatory disclosures.

Readers who are not familiar with the corporate reporting environments and regulations prevailing in the countries surveyed in the book will find useful and detailed information in the central chapters. They provide a comprehensive view of the development, status and current issues of financial reporting in these countries. Readers who expect an in-depth analysis of the merits and limits of reporting standards convergence, based on results taken from the academic literature, might be somewhat disappointed. Several researchers share the authors' scepticism about the possibility to develop and sustain uniform standards because of major differences in legal, governance and regulatory regimes. Many others recognise the danger of forcing a unique set of reporting rules that might often prove to be unsuitable, with a risk of promoting form over substance. However, extensive research, notably the empirical research on the impact of IFRS adoption, shows that reporting convergence is likely to improve investors' welfare because of its effects on information asymmetry, on stock market liquidity, and on the correlation between accounting figures and stock market data. In the same line, using the usual arguments related to the potential lack of reliability of fair value estimates, chapter 11 criticises the introduction of fair value in financial statements. Unfortunately, this criticism never mentions any of the numerous studies showing that the use of fair value may provide more value-relevant accounting figures. Introducing the main results of the research on the financial reporting issues discussed in the book might have shed a useful and interesting light on the discussion.

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Switzerland   Pascal Dumontier

Financial Reporting and Global Capital Markets. A History of the International Accounting Standards Committee, 1973–2000. *Kees Camfferman* and *Stephen A. Zeff.* Oxford: Oxford University Press, 2007. xxiii + 676pp. ISBN-13: 978-0-19-929629-3. £75.

Reading a history of the International Accounting Standards Committee (IASC) from 1973 to 2000 is rather like studying the career of the UK prime minister Clement Atlee. As Atlee himself put it:

'Few thought he was even a starter.
There were many who thought themselves smarter.
But he ended PM, CH and OM
An earl and a Knight of the Garter.'

There was little demand for international accounting standards in the 1970s and most of the 1980s and the IASC was at first treated with condescension by national standard-setters. However, when the globalisation of capital markets created the demand, the IASC had been in existence long enough and had been active enough to be the first choice to supply the demand and eventually transform itself into the International Accounting Standards Board (IASB), today's acknowledged setter of international financial reporting standards.

This apotheosis was not inevitable. Sir David Tweedie, chairman of the IASB, in his foreword to this book rightly praises authors Camfferman and Zeff for their 'scholarship, insight and sheer hard work'. Substituting 'technical skills' for 'scholarship', these are also the qualities of the many people who contributed to the success of the IASC from its modest beginnings to its replacement by the IASB a quarter of a century later. All receive their due in this book, which is written very much on the model that it is people who make history. A glance through the excellent index suggests that among the most influential of them were three English chartered accountants: Henry Benson (chairman 1973–1976), David Cairns (secretary-general 1985–1994) and Bryan Carsberg (secretary-general 1995–2001). All possessed, albeit in very different ways, the additional quality of being able (most of the time) to persuade other people to do what in their opinion was best for the IASC.

Part 1 of the book concerns the origins of the IASC. It confirms that Benson (who unlike Atlee did not become an earl but did become a lord) was the driving force behind its formation in 1973, also the year of the UK's entry into the EEC and the year in which the FASB was established in the US. The UK origin of the IASC is not surprising. There was no incentive for US accountants to form such a body. Continental Europeans had already established the Union des Experts Comptables Européens (UEC) in 1951 but this and other regional bodies lacked auditors and companies with world-wide outlook and ambition. From a UK point of view the IASC can be seen as a defence against both the domination of US GAAP and the encroachment of Continental European ideas on accounting. Its headquarters were always in London, its working language always English. Despite the lack of interest of most US accountants, US influence was important from the start. There was no future for international standards that differed too greatly from US GAAP. Canadian

and Australian accountants, sharing a common language and accounting culture with those in the US and the UK, played a role well beyond the economic importance of their countries. Collaboration between the accountants of these four countries (the so-called 'G4') was vital although at times resented by those outside the group.

Part II of the book deals with the period 1973–1987. The early standards of the IASC tended to be compromises and full of options. These years, during which the IASC, operating on a small budget and with little power, 'compromised to harmonize' were an essential preparation for later achievements. Crucially, also, its work on consolidation influenced the Seventh Directive of the EU. The turning point was 1987, the year in which internally the IASC took the strategic decision to produce more conceptually based standards, and externally was challenged to produce high quality standards by the International Organization of Securities Commissions (IOSCO), of which the US Securities and Exchange Commission (SEC) was the dominant member.

Part III of the book covers 1987–2000. During this period, the IASC sought to satisfy the demands of IOSCO. The result was the 'Comparability Project', the success of which made international accounting standards (IASs) more acceptable not only to the SEC but also to the European Commission. Continental European companies had become much more reliant than they had been in 1973 on world, especially US, capital markets. In the absence of suitable European standards, some were adopting US GAAP or IASs. Faced with a choice between them the Commission opted for IASs, since an official adoption of US GAAP was unthinkable. These successes of the IASC came at the cost of much hard work and of transforming itself into the IASB.

The book has the approval and support of the IASB but is written from an independent standpoint by authors representative of North America and the EU, whose linguistic skills cover Dutch, French, German and Spanish as well as English. They have not only read through the IASC's voluminous archives but have interviewed all the surviving major (and most of the minor) players. The interviewees are listed in one of the many useful appendices, which also cover the text of the 1973 agreement and constitution; chairmen and senior staff; members of the national delegations to the IASC; technical projects, exposure drafts and standards; venues and dates of board meetings; and unpublished sources. A chronology would also have been useful. There are 126 pages of notes but not, alas, a separate bibliography. The detail is at times overwhelming but is likely to be welcomed by future researchers who, even if they may not always agree with the judgments and conclusions, will

find this work indispensable.

On a lighter note, those of us who have sometimes thought that working for the IASC was about jetting all over the world and staying in luxury hotels, should ponder this wonderful quotation from Chris Nobes (a member of the UK delegation) about a seven-day meeting in Kuala Lumpur in April 1998:

'The Malaysians were well-organised and hospitable, but seven hours of jet lag were compounded by an element of surreality by our being in an enormous freezing hotel surrounded alternately by tropical sun and tropical storms, and by having to work long hours in sight of one of the world's largest artificial beaches. Added to the strain of this, the official evening receptions were non-alcoholic, given Malaysia's state religion.'

This is a very good book about a remarkable institution. As one would expect, the Oxford University Press has given it the production values it deserves, including many photographs (mainly but not entirely of sober-suited middle-aged males). It is a pity, however, that the authors did not veto the fuzzy map on the dust jacket, which is a very misleading representation of what the book is about.

University of Exeter R.H. Parker

Guide for Authors

General

Manuscripts should be in English and consist of original unpublished work not currently being considered for publication elsewhere. The paper should be submitted electronically as Microsoft Word files via e-mail to abr@cch.co.uk. An electronic acknowledgement of receipt will be sent by return.

If you have any problems sending a Word file as an attachment to an e-mail, please send an e-mail to the above address explaining the difficulty.

Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the paper shares data with another paper, an electronic copy of the other paper must be provided. Authors of accepted papers will also be asked to assign exclusive copyright to the publishers.

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Each submission should include a cover page in a separate Word file that contains the names, affiliations, and contact details of the author(s). The cover page should include the title of the paper and any acknowledgements to third parties. The main body of the paper should appear in a separate Word file, starting with the title of the paper, but without the author's name, followed by an abstract of 150–200 words. Keywords (maximum of five) should be inserted immediately following the abstract. The main body of the paper should start on the next page. In order to ensure an anonymous review, authors should endeavour to avoid identifying themselves. Section headings should be numbered using Arabic numerals.

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Each table and figure should bear an Arabic number and a title and should be referred to in the text. Where tables and figures are supplied in a format that can not be edited within a Word document, delay in publication may result. Sources should be clearly stated. Sufficient details should be provided in the heading and body of each table and figure to reduce to a minimum the need for the cross-referencing by readers to other parts of the manuscript. Tables, diagrams, figures and charts should be included at the end of the manuscript on separate pages, with their position in the main body of the text being indicated.

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Authors are asked to use mathematics only if it contributes to the clarity and economy of the article. Where possible, authors should restrict the use of mathematics to an appendix. Equations should be numbered in parentheses, flush with the right hand margin. Authors of mathematically-oriented papers written in Scientific Word or with some other mathematical word processing package are advised to consult with the editor about the format before making a formal submission, in order to avoid technical difficulties later.

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Accounting Standards Steering Committee (1975). *The Corporate Report*. London: ASC.
Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25(3): 208–218.
Watts, R.L. and Zimmerman, J.L. (1986). Positive Accounting Theory. Englewood Cliffs, NJ: Prentice Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

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Editorial Policy

Accounting and Business Research publishes papers containing a substantial and original contribution to knowledge. Papers may cover any area of accounting, broadly defined and including corporate governance, auditing and taxation. Authors may take a theoretical or an empirical approach, using either quantitative or qualitative methods. They may aim to contribute to developing and understanding the role of accounting in business. Papers should be rigorous but also written in a way that makes them intelligible to a wide range of academics and, where appropriate, practitioners. Presentation should be as elegant and economical as possible, avoiding unnecessary words, numbers or symbols.

All papers are subject to peer review on a double blind basis, either by members of the Editorial Board, or by invited reviewers of international standing. Reviewers are asked to comment in particular on the contribution, motivation and rigour of the analysis presented in the paper. The editor carries out an initial check that papers submitted comply with the guide to authors and advises authors where a paper has not met the essential criteria. Continuous monitoring of the review process aims at providing timely but informative feedback to authors. Subject to the recommendation of reviewers, research notes and commentaries may be published.

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Editorial

In collaboration with the Institute of Chartered Accountants in England and Wales, *ABR* is pleased to present the third issue of the *International Accounting Policy Forum (IAPF)*. The issue contains the papers presented at the Institute's 2007 Information for Better Markets Conference, which was intended to stimulate debate and new thinking on the subject of accounting for intangibles. The five papers written by leading international academics reflect the themes they were invited to develop in their presentations at the Forum, all providing different styles of thought-provoking evidence and comment. The responses from practitioners provide a taste of the lively debate provoked in a mixed audience of leading practitioners and policy makers sitting alongside academics from a spectrum of international institutions. It is the hope of the editor and the Institute that publication of the papers will encourage a continuing and widening debate which will facilitate better communication among the research community, the accounting profession, company managers, regulators and all other parties interested in the debate over whether and how to develop reporting models which incorporate information on intangibles.

The five main papers have been reviewed by academic reviewers and I am particularly grateful to the reviewers and the authors for the care they have taken with this process.

IAPF is explicitly charged with bridging the gap between academia and the profession. The contents of this issue provide many opportunities for engaging research and practice.

Pauline Weetman

Introduction

The five papers in this issue of *International Accounting Policy Forum* address different aspects of the question of intangibles – a highly controversial subject in recent decades.

The points on which there is no dispute are that intangibles are extremely important, that nevertheless most intangibles do not appear in the balance sheet and that, with some exceptions, the minority of intangibles that do appear there are not reported at their current values. From this common starting-point people move on to arrive at widely differing conclusions.

In *New Reporting Models for Business* (2003), one of the first reports published by the Institute of Chartered Accountants in England and Wales (ICAEW) in its Information for Better Markets campaign, we looked at some of the most prominent calls for major reform in business reporting. We noted that those who called for reform typically:

- asserted that there had been a tremendous growth in the importance of intangibles and that they were now the key drivers of business success;

- argued that intangibles' absence from the balance sheet was a fundamental weakness in financial reporting, which meant that investors were being seriously misled; and

- concluded that the answer lay in the provision by businesses of more non-financial, qualitative, and forward-looking information (although there were also some calls for reform to financial reporting).

Hence – and for other reasons that had nothing to do with intangibles – the calls for a new business reporting model that would tell businesses what they should disclose.

There seemed to us to be a number of questions that deserved investigation. And so we commissioned the five papers that now appear here and which were first presented at the Information for Better Markets Conference held at the ICAEW in December 2007.

Without wishing to attempt a summary of the papers, there are one or two key points in each of them that are worth mentioning as particularly relevant to the issues raised by those who call for a new reporting model.

Sudipta Basu and Gregory Waymire's original and intriguing paper shows that intangibles have always been – and always will be – of essential importance to economic activity and also that tangibles and intangibles are often inextricably linked. In addition, the paper provides a helpful analysis of the reasons why intangibles might have become more (or less) important.

Douglas Skinner's paper provides a powerful defence of the current treatment of intangibles in the financial reporting model and explains why a balance sheet that attempted to incorporate all intangibles at current values would probably not provide useful information for investors. Further, it shows why there are good reasons to be sceptical of claims that intangibles' absence from the balance sheet has led to serious – or indeed any – economic harm. It also sets out a cogent argument against trying to develop a detailed model for useful disclosures about intangibles.

Anne Wyatt's paper is an extremely helpful review of the existing literature on value-relevance and intangibles. It demonstrates the almost incredible diversity of potentially relevant information on intangibles and, interestingly, draws attention to evidence that giving management discretion to report intangibles might facilitate more value-relevant disclosures.

In contrast to the preceding papers, Christopher Ittner's concentrates on measuring intangibles for management purposes. It exposes important weaknesses or limitations in much of the existing literature on this topic and shows the need for great caution in making statements about the purported link between measuring intangibles and improved performance. Professor Ittner does not address whether all this has any implications for external reporting, but I believe his paper will prove to be very useful from that point of view as well.

Andrew Stark's paper, as well as giving a valuable overview of the issues and drawing attention to some of the UK evidence, also has important conclusions on the desirability or otherwise of imposing a broad disclosure framework for intangibles. He notes that, at least in the UK, it is not clear that such a framework would be a useful addition to existing requirements.

Although there are substantial areas of agreement among the five papers published here, it would be foolish to imagine that the controversy about intangibles will now go away. Indeed, I am

pleased to see that Baruch Lev has contributed a rejoinder in this issue – and so to that extent the debate is not completely one-sided. There also remain important questions, not addressed here, about the recognition and measurement of intangibles that are candidates for inclusion on the balance sheet even under the existing financial reporting model.

All of the contributions to this publication – including the practitioner commentaries – will be most helpful to the ICAEW in our continuing work on the questions addressed in *New Reporting Models for Business*. And I have no doubt that our forthcoming follow-up report, *Developments in New Reporting Models*, will draw extensively on the material presented. I hope that this issue of *International Accounting Policy Forum* will also be of use to all those interested in the debate on intangibles and that it will stimulate further research.

I am grateful to all the distinguished academic and practitioner contributors to this publication and, once again, to Pauline Weetman for her support and hard work as editor. Finally, I must thank the ICAEW's charitable trusts, which generously provided funding to support the conference last December and the preparation of these academic papers, and the publishers, CCH, who have now assumed responsibility for financing the publication.

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Has the importance of intangibles really grown? And if so, why?

Sudipta Basu and Gregory Waymire*

Abstract—Intangibles are ideas or knowledge about the natural (physical and biological) and socio-cultural worlds that enable people to better accomplish their goals, both in primitive societies and in modern economies. Intangibles include basic research and technology improvements, as well as knowledge to better organise exchange and production, and over time become inextricably embedded in improved tangible assets. Accounting intangibles are legally excludable subsets of economic intangibles, which in turn are the subsets of cultural intangibles that can be used to create tradable goods or services. Because economic intangibles are cumulative, synergistic, and frequently inseparable from other tangible assets and/or economic intangibles not owned by any single entity, it is usually futile to estimate a separate accounting value for individual intangibles. However, the income that intangibles together generate provides useful inputs for equity valuation, and voluntary non-financial disclosures could be informative for this purpose.

Key words: patent; trademark; fair value; Moka; gift exchange

1. Introduction

Some accounting experts argued in recent years that the increased economic importance of intangibles required an overhaul of corporate financial reporting.[1] The most visible academic reformer was Baruch Lev (2001: 9), who asserted that fundamental changes related to intangibles had transformed the nature of the corporation itself (see also Stewart, 1997; Teece, 2001):

'What is new, driving the recent (since the mid-1980s) surge in intangibles, is the unique combination of two related economic forces. One is intensified business competition, brought about by the globalization of trade and deregulation in key economic sectors (for example, telecommunications, electricity, transportation, financial services). The second is the advent of information technologies, most recently exemplified by the Internet. These two fundamental developments – one economic and political, the other technological – have dramatically changed the structure of corporations and have catapulted intangibles into the role of the major value driver of business in developed economies.'

Several conferences were organised to identify and assess the problems associated with poor disclosure and recognition of accounting intangibles.[2] Many practitioners, consultants and regulators argued that financial statements were inadequate because the balance sheet did not report many valuable intangible assets and concluded that accounting reports needed significant change (e.g. Edvinsson and Malone, 1997; Sveiby, 1997; ICAEW, 1998; Leadbeater, 1999; Lev, 2001; Eccles et al., 2001; Blair and Wallman, 2001; MERITUM, 2002; Low and Kalafut, 2002).

We take a contrary perspective in this essay and assert that arguments favoring the expanded reporting of intangible asset values in balance sheets are flawed for three reasons. First, recent times are not unique in terms of the importance of intangibles. Indeed, intangibles are ubiquitous to human economic interaction and are present even in seemingly simple economies. Second, intangibles are ideas that build on other ideas to generate complementarities and synergies. The consequence of this is that the value of an individual idea typically cannot be discerned independently of other

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Editorial Note
The discussant for this paper was Chris Swinson, Comptroller and Auditor General of Jersey. A webcast of the session is available on the website of the ICAEW http://www.icaew.com/

[1] At a US Senate Committee on Banking, Housing and Urban Affairs hearing on 19 July 2000, Adapting a 1930s Financial Reporting Model to the 21st Century, five accounting experts all testified that corporate financial reports inadequately treated intangible assets, and these had recently grown considerably (Lev 2001: 7).

[2] The OECD has held numerous conferences on intangibles, such as the International Symposium on Measuring and Reporting Intellectual Capital: Experience, Issues and Prospects, Amsterdam, 9–11 June 1999. See http://www.oecd.org/document/15/0,3343,en_2649_201185_1943055_1_1_1_1,00.html. Litan and Wallison (2000) summarise conclusions from two conferences on intangibles at the Brookings Institution and Stanford University. The Intangibles Research Center at New York University held four conferences on intangibles from 1998–2001 (http://w4.stern.nyu.edu/ross/events.cfm?doc_id=7049).

Figure 1
An anthropological perspective on different definitions of intangibles
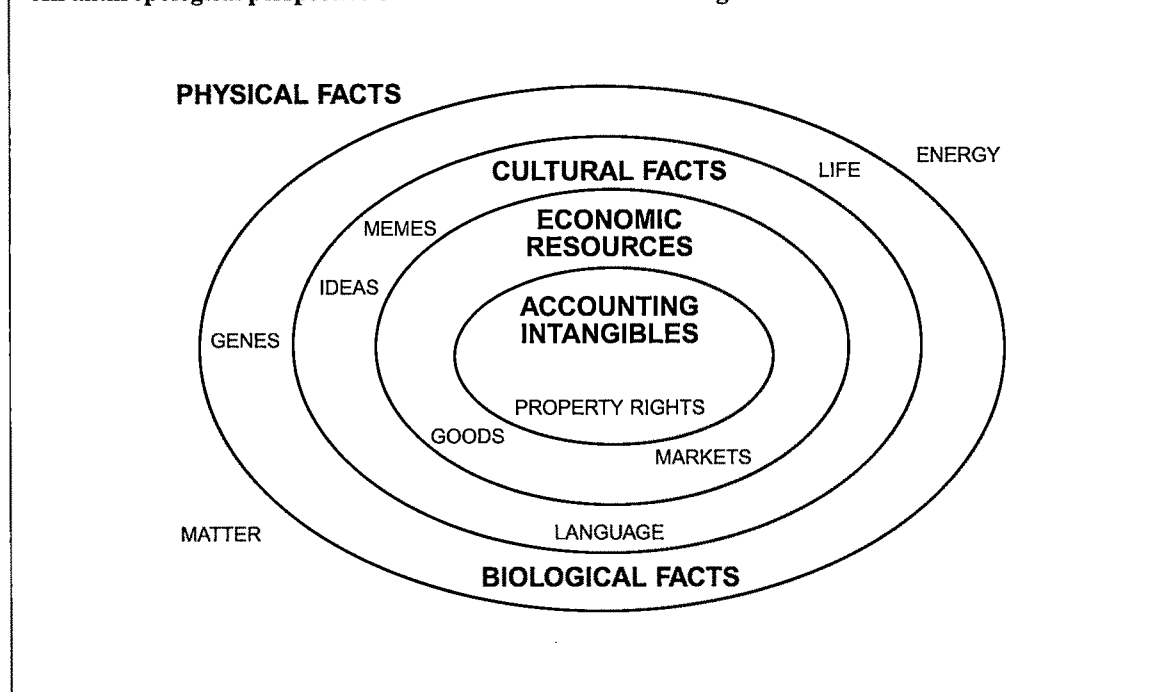
ideas, many of which are not owned by any given firm. Third, ideas are valuable only to the extent that they increase wealth or, in accounting parlance, give rise to income. Thus, emphasis on the balance sheet is itself misplaced, and a *return to measuring income* will likely serve financial statement users better than trying to value assets that by their fundamental nature cannot be independently valued.

The last 10,000 years have seen the human species transform from small nomadic hunter-gatherer bands not far removed from their primate cousins, chimpanzees and gorillas, to citizens living in vast cities of more than 20 million people. Many civilisations have waxed and waned over these thousands of years, and living standards have risen and fallen, often dramatically. However, the overall trend has been towards improved standards of living. We argue that human progress has *always* reflected accumulated human ingenuity and, in large part, the cultural mechanisms that people have developed to accurately store, and subsequently accurately transmit, valuable information across time and space. That is, people always and everywhere have produced and implemented ideas to increase their productivity; indeed intangibles are ubiquitous to human economic interaction.

Accounting intangibles are only a small subset of valuable economic and cultural intangibles. Figure 1 depicts the relations between different kinds of intangibles as a tiered cake viewed from above. The bottom layer is a set of physical facts

and laws that biological organisms exploit to propagate their species and genes. These natural facts are largely givens from a human viewpoint, and directly influence behaviour such as food gathering and production strategies. As people discover survival-enhancing facts and routines, they often imbue this knowledge with religious or moral significance, such as taboos or rituals (Burriss, 1929; Lepowsky, 1987). As a result, new 'goods' are created – for example, when a particular fruit becomes holy. People thus add a layer of cultural ideas to a subset of the pre-existing natural facts, and the structure of ideas builds upwards. Ideas later take on a life independent of their discoverers and become cultural intangibles – that is, 'memes' that compete with each other for survival (Dawkins, 1976).

Some innovators create wealth by exploiting natural resources to deliver new goods that people value, or invent more efficient production and distribution systems (Schumpeter, 1942; Burgelman et al., 2001). These entrepreneurs try to make their services unique and non-duplicable to increase the value their knowledge will fetch in trade (Teece, 1987). If the legal system recognises and protects private property rights over the benefits to these innovations, then a firm can report the property rights it owns or controls on the balance sheet as intangible assets. Enforceable private property rights suffice for the balance sheet reporting of accounting intangibles under current practice, although the reported values typically approximate

market values only if they were recently acquired externally.[3] Thus, we define accounting intangibles as the legally excludable subset of economic intangibles, which are in turn defined as the subset of those cultural intangibles that directly or indirectly generate consumable goods or services. The broader sets of intangibles provide useful benchmarks for assessing if accounting intangibles owned by corporations have become more important recently.

The consequence of this broader perspective is that accounting intangibles must be examined holistically with a clear recognition that the value of an individual idea is not separable from the complementary ideas that enabled its creation. The accumulation of ideas means that what was once novel eventually becomes routinised and mundane. Furthermore, new knowledge provides ideas for new goods, and these new tangible assets incorporate and embody the once intangible idea. Improvements in tangible assets arise from combining new ideas with the ideas that originally gave rise to the assets, which generates synergies and complementarities that are difficult to apportion to the constituent ideas, many of which have different owners.

Ideas are economically valuable only to the extent that they lead to an increase in wealth, the accounting analogue of which is to generate income. However, in addition to complementarities among intangibles, these assets typically generate wealth indirectly through the tangible assets that embody them. Thus, their value is often inseparable from the tangible assets that incorporate them. Firms also benefit immensely from valuable intangibles, such as rule of law, that are shared by all citizens, and others, such as human capital, that firms do not own but merely rent from their employees. Thus, any attempt to report economically valuable intangibles as assets on corporate balance sheets is likely to be a futile exercise for the majority of intangibles. Hence, we believe that accounting is better served by measuring the income that intangibles generate, which can provide more informative inputs for firm valuation. This view is fully consistent with more traditional views of assets as cost investments made in anticipation of future economic benefits (Littleton, 1929; 1935; 1952).

The paper is organised as follows. The ubiquity of intangibles is illustrated with an example from anthropology in Section 2. The lack of separability and the dynamics of intangible creation and storage are described in Section 3. Section 4 provides an analysis of the wealth creation role of intangibles in modern economies. We discuss evidence on whether the value and importance of intangibles has actually increased in Section 5. Some concluding remarks are provided in Section 6.

2. The ubiquity of intangibles: an example from a simple exchange economy

Adam Smith (1776) recognised exchange and division of labour as the sources of human economic progress when he wrote:

'This division of labor, from which so many advantages are derived, is not originally the effect of any human wisdom, which foresees and intends that general opulence to which it gives occasion. It is the necessary, though very slow and gradual, consequence of a certain propensity in human nature which has in view no such extensive utility; the propensity to truck, barter, and exchange one thing for another.'

This quotation makes us think of familiar institutions: *firms* that coordinate specialised production and *markets* where the output of production is exchanged against money.

A sole focus on modern institutions is too narrow to grasp the genesis of what Smith refers to as a 'propensity in human nature' to exchange and the nature and magnitude of economic gains that result from such propensities. The propensity to exchange is represented in its most primitive form as a gift (Mauss, 1950). Most gifts are resource transfers where the recipient of the gift is expected to reciprocate in the future. The exchange of ceremonial gifts and their unstated but powerful expectation of reciprocity are the bases upon which human economies evolve from modest beginnings (Boulding et al., 1972; Sahlins, 1972).[4]

One example of a gift economy is the *Moka* economy of the Mount Hagen area of the Western Highlands of New Guinea, subjected to ethnographic study by Andrew Strathern (1971).[5] The Hageners live in settlements controlled by smaller clans within several large tribes of sizes ranging from less than 100 to nearly 7,000 persons

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[3] See footnote 8 for a discussion of our definition, which essentially combines the notion of separability with the recognition criteria in IAS 38 (IASC, 1998) and is similar to US practice under SFAS 2 (FASB, 1975).

[4] Modern economies contain large gift exchange sectors where reciprocation is usually expected. Gift giving in modern societies reflects deep-seated cultural norms that hark back to ancestral gift economies characterised by generalised reciprocity (Sahlins, 1972). Gift exchange in modern economies also generates both demand for and supply of innovation. Roberts (2005) argues that people give unique gifts to demonstrate how much the giver values the recipient. Some people may express this uniqueness by making their own gifts and in the process hone their hobby skills. These part-time hobbyists may eventually convert their hobbies into part-time jobs. While experimenting with new ideas and techniques to maintain uniqueness, these hobbyists may discover new artistic and/or technical skills that allow them to become full-time producers who eventually compete on artistic and technical design features with other specialist producers.

[5] Other economies built around elaborate gift exchange customs include Kula gift exchange in the Trobriand Islands (Malinowski, 1922) and the Potlatch of Indians in the American Northwest and Siberia (Mauss, 1950; Suttles, 1960).

(Strathern, 1971: 230–231). The Hagener econo-
my is agricultural, with the food staples being
pork, sweet potatoes, and a few other vegetables,
such as bananas, sugar cane, taro, yams, maize and
cassava. Women do most of the work in child rear-
ing, care and feeding of the family's pigs, and on-
going care and harvesting of the gardens
(Strathern, 1971: 8–10). Men clear the land for
planting and build fences and ditches around the
gardens. They also spend much of their time
preparing for, participating in, and developing the
complex social networks that sustain *Moka*.

The 'Big Man' is a prominent player in the
Hagener society. A Big Man holds a position of
status and leadership based on a reputation for
trustworthiness and wisdom built up from past
successful *Moka* exchange.[6] Any given clan will
include one (or a few) major Big Man along with,
typically, several lesser Big Men (Strathern:
187–213). The status of Big Man can be lost since
a Big Man faces stiff competition from others in
making successful *Moka* and sustaining a network
of followers.

Strathern (1971: 10–14 and 93–229) describes
Hagener Moka exchange, which is a ceremonial
gift exchange that takes place over several rounds
of exchange. Preparation for a successful *Moka*
exchange takes several months. An initiating gift is
made to build alliances between tribes, to make
payments to a bride's family or for reparations for
death in warfare, and, in some cases, for more rou-
tine exchanges. An initiating gift must be recipro-
cated with a gift of greater value, which consists of
a payment of the debt created by the initial gift and
a residual. This residual above the original debt is
the *Moka* provided by the gift. This series of gift
exchanges is continued as long as the current gift
exceeds that of the prior round. The items ex-
changed in a *Moka* transaction include pigs and
pork meat, marsupials and their meat and furs, cas-
sowaries (a bird indigenous to New Guinea) and
their meat and plumes, axes, salt, decorating oils,
and various forms of attractive shells (e.g. pearl
shells, cowries, etc.).[7]

Wealth in the Hagener society results from ani-
mal husbandry of pigs, as well as the hunting of
other animals, cultivation of crops, and the acqui-
sition of valuables from external trade. The social

value generated by *Moka* exchange depends on
others contributing valuables to the transaction,
which requires that network members defer their
own consumption or work harder to produce the
items that will be given away in the exchange. To
secure this cooperation, the Big Man must con-
vince others that his *Moka* will be successful and
that he will be able to return something of greater
value to them in the future. In other words, *Moka*
becomes a positive sum game through the organi-
sational skill and effort of the Big Man.

Turning now to the 'accounting' problem, the
tangible assets of the Hagener economy include
agricultural implements, seeding for sweet pota-
toes, a stock of pigs that can be bred, housing stock
(for both pigs and humans), and other assets (e.g.
guard dogs) to protect the pigs from predators and
poachers. The community's most valuable asset is
the stock of knowledge of community members
about existing production technologies (e.g. plant-
ing and husbandry), as well as knowledge about
the socioeconomic arrangements that enable coor-
dinated production and exchange (i.e. the commu-
nity's economic intangibles).

This economic intangible or knowledge asset is
fundamentally different from a tangible asset in
that its existence cannot be verified merely by
visual inspection of the person carrying the knowl-
edge. Rather, the asset's existence is only demon-
strable by observing the economic transactions
coordinated by the individual carrying the knowl-
edge. In this sense, the important financial meas-
ure for someone evaluating the effectiveness of the
Moka system is the economic value created
through the specialised division of labour that is
enabled by exchange. The measurement issue is one
of identifying the value added by use of the assets
(i.e. income) rather than valuing the asset per se.

Returning to the economics of the problem re-
quires that we think seriously about how institu-
tions develop to enable economic gains. These
institutions, whether we call them markets, firms,
networks, or legal systems, define the rules of
competition used to secure human prosperity
(Coase, 1937, 1960; Schelling, 1995; North,
2005). The main 'assets' that humans have ex-
ploited to secure this prosperity are ideas that can
be translated into actions to produce consumption
goods or more productive tangible assets that ful-
fill longer term purposes.

These ideas, and the institutions that result, have
long path-dependent histories. The roots of mod-
ern economies based on reciprocity lie in the gift
exchange economies of more primitive societies
(Boulding et al., 1972). Modern economies
evolved from primitive economies by creating,
storing and diffusing human knowledge in ways
that made economic interactions more fruitful, and
that ultimately led to vast improvements in eco-

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[6] The sons of Big Men often become Big Men themselves,
but the role of Big Man is not an inherited position. Rather,
sons of Big Men are more likely to succeed by emulating those
qualities in their fathers that made them successful in *Moka*
and other activities, like building networks and alliances with
other clans and providing leadership in making peace or insti-
gating war.

[7] The shells served a monetary function in that they could
be traded for other commodities in routine trade outside the
Moka. The use of shells as money is not unique to the
Hageners; for example, the wampum of Native Americans
were shells that served as money (Szabo, 2005).

nomic welfare (e.g. Nelson and Phelps, 1966; Kremer, 1993). Accumulated human knowledge allows us, for example, to transform sand into glass or silicon chips, thereby transforming an almost boundless supply of cheap raw materials into valuable art objects or work tools.

The main conclusion from this section is that modern economies have distant roots in the past, and one source of this connection is the ubiquity of economic intangibles. This is important because it suggests that if modern complex economies are different in their use of economic intangibles, the difference is one of degree rather than of kind.

3. Non-separability and the dynamics of intangibles creation

In this section, we discuss the dynamic processes that lead to the creation, storage, diffusion and preservation of different kinds of intangibles. This is necessary to illustrate how accounting intangibles in most cases are not separable from other assets. Before we proceed, we briefly return to Figure 1 to define accounting, economic and cultural intangibles and their interrelationships.

3.1. Defining different sets of intangibles

Accountants typically distinguish intangible assets from other assets based on them not having physical substance and not representing purely financial contracts (investments). In addition, accountants typically describe intangible assets as having highly uncertain and ambiguous future benefits. This rationalises the common practice of expensing the costs of most internally developed intangibles as they are incurred rather than deferring the expenditures as assets to match against future revenues, for example, IAS 38 (IASC, 1998). We define an *accounting intangible* as the legally recognised right to exclusively exploit an idea for a defined time period to generate cash inflows.[8] Some innovators prefer to use informal mechanisms rather than the legal system to protect the fruits of their ideas. For example, Coca-Cola has not patented its formula and relies on trade secre-

cy, while magicians (Loshin, 2007) and French chefs (Fauchart and von Hippel, 2006) rely on social norms to protect their valuable intellectual property. As such, these economically valuable ideas were not reported as assets on balance sheets, and even following recent changes in accounting for intangibles (SFAS 141 and IAS 38), are likely to be recognised only as part of purchase accounting for a business combination.

Growth economists like Solow (1956) and Lucas (2002) identify ideas and knowledge as having the largest impact on human economic progress. Romer (1990) identifies several features of knowledge intangibles that distinguish them from physical assets as well as public goods. One important feature is that economic intangibles tend to be *non-rival*: consumption by one person does not preclude consumption by another because there is no physical feature that is transformed by consumption. For example, many cooks can use instructions such as recipes simultaneously, but only one cook at a time can use a particular knife or utensil (Warsh, 2006). Importantly, economic intangibles create value by better use of complementary tangible and intangible assets. Because they can be expressed as digital bits that are cheap to copy, economic intangibles tend to have high fixed costs and low marginal costs of production. Economic intangibles tend to be unique almost by definition, making it relatively difficult to set up organised markets for transacting in them. Network effects sometimes characterise economic intangibles in that their value increases with the number of users, such as a standard like uniform bar codes. For present purposes, we define an *economic intangible* as an idea that ultimately helps produce valuable goods and services for consumption either directly or indirectly. A representative example of an economic intangible is the design of a new good or service. While both economic intangibles and public goods are non-rival, public goods are non-excludable whereas economic intangibles can be made (partially) excludable by legal protections or by encryption, secrecy or social norms (Romer, 1990).

Ideas that contribute to the survival and development of a society are also valuable even though they may not directly yield tradable goods and services. For instance, personal hygiene norms slow the spread of communicable diseases and increase the viability of a culture. We define a *cultural intangible* as an idea or mental construct that is preserved and transmitted across time, and enhances the survival fitness of persons within the culture. Accounting intangibles are a legally protected subset of economic intangibles, which are in turn a subset of those cultural ideas that directly or indirectly generate consumable goods and services. These broader sets of intangibles are useful benchmarks for assessing whether the accounting

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[8] This definition is consistent with US practice (SFAS 2: FASB, 1975) as well as the narrower concept of separability in IAS 38 (IASC 1998). Under purchase accounting for business combinations (e.g. IFRS 3: IASB 2004; SFAS 141: FASB 2001), residual values needed to balance journal entries are labelled goodwill, which are then categorised as intangible assets. Because these residual values have unidentifiable sources and indefinite lives and could be mere accounting artefacts, we exclude them from our theoretical analysis. Both SFAS 141 and IAS 38 require that firms allocate purchase accounting residual values to several asset categories and subcategories (at a reporting segment level) that were previously not recognised on balance sheets, such as customer relations and unpatented trade secrets. These allocations and estimates are almost surely very noisy partitions of the residual value, so we discuss them no further.

subset owned by corporations has increased in importance recently.

3.2. Creation of accounting intangibles

Accounting intangibles result from a dynamic process where facts about the natural world are discovered (cultural intangibles or basic research), converted into economic goods and services (applied research or invention) and commercially exploited (innovation), and eventually monopolised as exclusive legal rights to benefit from an idea. Thus, increases in the quantity or value of accounting intangibles can arise from increases in the total set of cultural intangibles holding conversion rates constant, or increases in the fraction of cultural intangibles that inventors convert into consumable goods and services, or changes in the legal and enforcement system that make formal legal protection preferable to informal protection of valuable economic ideas.

To begin our analysis of accounting intangibles creation, consider a well-known accounting intangible – Edison's patent for the electric light bulb. Light was created as a physical fact at the Big Bang nearly 14 billion years ago (Spergel et al., 2003). Animals began using light when they developed sight about 530 million years ago (Parker, 2003). About 1.4 million years ago, our hominid ancestors learned to control fire to ward off predators, cook food and create cave paintings (Uhlig, 2001: 11). Humans developed fuel lamps about 70,000 years ago, and candles were invented 5,000 years ago to provide brighter and better-controlled illumination (Uhlig, 2001: 20). Gas streetlights replaced candles in 1820 (in Pall Mall, London) and electric light bulbs provided light after Swann and Edison's 1879 invention of the carbon-filament incandescent lamp. Nordhaus (1997) estimates that the labour hours needed to buy 1,000 lumens of light in 2000 was about 1/10,000 of its price in 1800, which in turn was 1/10 its price in 2000 B.C. Babylon, indicating that light technology has improved dramatically over the past 200 years.

The discovery of fire control, and basic research more generally, was probably motivated by intrinsic curiosity. Galenson (2005) argues that the careers of great artists follow two different paths. Experimental innovators, such as Michelangelo, work gradually by trial and error, and arrive at their major contributions later in life. By contrast, conceptual innovators, such as Picasso, make sudden breakthroughs by formulating new ideas, usually at an early age. Jones (2007a) analyses the careers of great inventors and Nobel Prize winners and finds that the mean age at which great breakthroughs were made has increased by six years over the 20th century. This is a consequence of an increased 'burden of knowledge' that new innovators must master before they reach the frontiers of their research

areas (Jones, 2007b). This is reflected in increased times to earn Ph.D.s, greater specialisation within subject areas, and increased reliance on teamwork for innovation (Wuchty et al., 2007).[9]

Important scientific discoveries are not distributed uniformly across societies or through time, but rather appear in clusters in a non-monotonic and punctuated evolutionary process. A more-populated society likely has a larger knowledge store of physical facts and observed regularities, which discoverers can seek to better understand (Simon, 2000). In this sense, human population (or more accurately, their combined knowledge) is the ultimate resource (Simon, 1981). A society possessing more people with the health, education and leisure to devote purely to research is likely to have better chances of discovering basic ideas, since specialised division of labour is generally more efficient (Smith, 1776). Societies where more discoverers work in close physical proximity are more likely to reap the benefits of complementarities and synergies in the generation and refinement of ideas (e.g. Kelley, 1972). This is why cities have historically been hubs of discovery and innovation (Jacobs, 1969, 1984; Bairoch, 1988). Basic research is more likely to flourish in societies that value knowledge and reward new discoveries, and large civilisations are likely to have a greater diversity of rewards that appeal to different explorers. Finally, more peaceful and stable societies are better able to reduce the economic uncertainty associated with exploring the frontiers of knowledge (North, 2005).

Inventors and especially innovators tend to be more motivated by monetary rewards. The entrepreneur seeks to exploit his local or specific knowledge of demand and supply to generate economic profits (Hayek, 1945). Risk-tolerant entrepreneurs tend to experiment with their products and processes to develop the proverbial better mousetrap. Entrepreneurs monitor and learn from their environments, and are generally quick to imitate successful competitors.[10] The entrepreneurial

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[9] Gurven et al. (2006) document that while adult physical size is necessary for basic hunting ability in hunter-gatherer societies, developing sufficient skill to track and capture important prey items generally takes 10 or 20 years after achieving adult body size, indicating that mastering a large body of specialised knowledge is very valuable even in primitive societies.

[10] Schumpeter (1939: 100) provides a similar account to ours, 'Considerations of this type [the difficulty of coping with new things] entail the consequence that whenever a new production function has been set up successfully and the trade beholds the new things done and its major problems solved, it becomes easier for people to do the same thing and even improve upon it. In fact, they are driven to copying it if they can, and some people will do so forthwith. [Hence, it follows that] innovations do not remain isolated events, and are not evenly distributed in time, but that on the contrary they tend to cluster, to come about in bunches, simply because first some, and then most, firms follow in the wake of successful innovation.'

risk-taker is usually more interested in knowing how well something works rather than understanding precisely why it works. Competition between entrepreneurs provides the incentives for discovery of new economic goods and services (Hayek, 1968).

Because entrepreneurs constantly borrow and incorporate the ideas of others, ideas are continuously reshuffled and recombined, often in far-removed locales. As risk-taking entrepreneurs are tested by competition, weak ideas are weeded out by business failures in a process similar to natural selection acting on genes (Alchian, 1950). Ideas become adapted to their environment, but they may also 'exapt', whereby a response to one problem turns out sometimes by accident to solve a different problem (Dawkins, 1976). For example, frozen popsicles were invented by accident in 1905 after a soda maker accidentally left a batch of drink outdoors overnight and it froze (Ng, 2007). Environmental changes, whether natural or cultural, also likely play a major role in knowledge creation. For instance, many archaeologists believe that an Ice Age about 40,000 years ago provided the stimulus for art and spoken language (Appenzeller, 1998; Holden, 1998), while the most recent Ice Age, ending about 12,000 years ago, sparked agriculture (Pringle, 1998; Mithen, 2004). Since environmental changes are infrequent and unpredictable, this could in part explain why idea creation is not uniformly distributed over time.

3.3. Storage, diffusion, and preservation of intangibles

The strong complementarity inherent to intangibles implies that their creation will be most pronounced when ideas are widely known and shared among the developers of new ideas. The economic value of ideas depends on the ultimate consumer surplus they generate, which is increasing in the total number of consumers served now and into the future. Effective storage, diffusion, and preservation of intangibles are thus necessary for current knowledge to be leveraged to develop new ideas and exploit their potential within and between societies (Kuznets, 1966: 290).

Historically, geographical barriers such as mountains, rivers and oceans have restricted movement of people and hence have slowed the spread of ideas from one society to another. To the extent that neighboring areas had very different climates and natural resources, ideas that were

useful in one area might not be valuable in another.[11] Historically separated human populations frequently have different languages and cultures, which can inhibit diffusion even when contact between societies occurs. At the same time, traders such as Marco Polo, missionaries like David Livingstone, adventurers like Christopher Columbus, and warriors like Alexander the Great have left home to seek their fortunes, taking their customs and ideas with them to new lands (Chanda, 2007). While such ventures have been episodic, they have been part of human history since modern man migrated out of Africa about 100,000 years ago.

Ideas can be communicated more accurately by cultures with a more developed spoken and written language, which promotes preservation and transmission across generations (Donald, 1991; Pinker, 2003). Standardised weights, measures, and numerals make it possible to develop recipes and formulas as shorthand for storing successful combinations of ideas. Improved representation of abstract ideas ensures near-exact duplication of successful processes, and the improved organisation of production increases efficiency (Kuznets, 1966). An effective legal system protects both tangible and intangible assets, and can increase the expected returns to innovation (Spar, 2001; North, 2005). Likewise, governments that are open to trade with other societies increase their citizens' exposure to new ideas.

The ideas that underlie intangibles may not last forever. Accounting intangibles can get destroyed if their legal protection is removed by private litigation, a law that changes the terms of patent or copyright protection, government nationalisation, and so on. Economic intangibles can be destroyed by state regulation, taxes or tariffs, as well as by lax governmental protection of property, which makes piracy of ideas more attractive than production for exchange.[12] Cultural intangibles can be destroyed by external conquest, the rise of new religions, or environmental changes that lead to widespread disease or natural disasters. Rapid technological change could also result in over-consumption of natural resources and environmental collapse, forcing a society to resettle (Tainter, 1988; Diamond, 2004).

More generally, extensive government power enables rent-seekers who prefer to expropriate others' wealth rather than create their own through personal initiative (Olson, 1965). Corrupt government officials utilise bureaucratic red tape to extract bribes that reduce economic efficiency and the value of intangibles (de Soto, 1989, 2000; Buchanan and Yoon, 2000). Predatory or ideological governments are especially dangerous in that they usually target the successful entrepreneurs for expropriation to protect entrenched interest groups

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[11] Diamond (1997) argues that agricultural and animal husbandry technologies were more likely to spread along the same latitudes in Eurasia with similar climates than along the same longitudes in Africa and South America.

[12] Technological obsolescence may constitute a net gain in intangibles and is an indispensable part in the process of 'creative destruction' (Schumpeter, 1942).

(Rajan and Zingales, 2003).

The main point from our discussion in Section 3 is that societies that possess large numbers of talented, educated, and risk-tolerant people best foster the creation of intangibles. This is leveraged by networks that promote the development and diffusion of ideas that build on past knowledge and survive the selection pressures of competition. The most notable feature of settings conducive to intangibles is the extensive complementarities and synergies between new ideas, concurrent developments, and accumulated knowledge from the past. The practical accounting implication of these complementarities and synergies is that the value of a specific accounting intangible is not in general separable from the culture, economy, and organisation within which it will be employed. Thus, even if intangibles have grown in importance, it is not obvious that they can be valued accurately as independent assets.

4. The economic role of intangibles in modern economies: wealth creation

In this section we discuss the implications of intangibles for wealth creation within modern economies. We begin by discussing the role of government and developed markets for exchange, since both are precursors to large-scale corporate organisations. We then describe the wealth creation role of intangibles in the modern corporation.

4.1. Government and the emergence of market exchange

Productive efficiency implies that individuals produce more than they can consume. Surplus production also generates incentives for other individuals to expropriate others' output rather than producing it themselves. Effective political organisations like governments essentially monopolise coercion. Olson (1993) argues that a roving bandit in an anarchical stage has an incentive to take whatever his victims have. However, a bandit leader can also choose to seize and hold a given area, by which he would benefit from voluntarily limiting his thefts and providing a peaceful order so that others within his sphere of control have an incentive to invest and produce. In this conception, a short-horizon roving bandit has an incentive to make himself a long-horizon public-good-providing monarch (McGuire and Olson, 1996). This 'public choice' conception of government (Buchanan and Tullock, 1962) has led to metaphors such as a 'visible boot' or 'grabbing hand' for rent-seeking individuals who use the power of government to expropriate wealth (Frye and Shleifer, 1997).

While dictatorships are not the only form of government, Olson (1965) shows that rent-seeking individuals will always try to cartelise valuable

goods and services. For instance, occupational groups lobby for licensing or certification to create an oligopsony for their services and raise their average group incomes without providing any higher quality of service (Stigler, 1971; Kleiner, 2006). In countries with powerful governments, it is important to have access to political power that can enable beneficial private action. When government agencies compete with each other, we frequently observe an 'anti-commons' problem where profitable actions will not be taken because of excessive bureaucratic obstacles to overcome, even with bribes or lobbying (De Soto, 1989, 2000; Buchanan and Yoon, 2000). The result is that people choose to conduct economic exchanges in black markets, typically paying local gangs for protection (Frye and Shleifer, 1997).

North et al. (2006) provide an integrated view of political and economic organisation wherein the natural state of government is a limited access social order that restricts competition to create rents, which in turn provide the foundation for stable political organisations. By contrast, they suggest that more recent periods have seen the emergence of open access orders, where political stability and economic growth are achieved through economic and political competition. North et al. argue that the emergence of open access orders involves a lengthy developmental process where co-evolution of political and economic institutions incrementally leads to wider access to potential economic gains and increased competition for such gains among various actors within an economy. For present purposes, it is sufficient to note that open access orders with governments that promote competition and protect property rights are essential for the value of intangible assets within an economy to be realised.

Modern economies contain large, developed market-exchange sectors that could plausibly be viewed as natural extensions of gift economies (Roberts, 2005) and are more likely to flourish under open access orders. As the number of group members grows within a society, repeated interaction with familiar partners occurs less often (Dunbar, 2001). In addition, individual cooperation with members of other groups cannot rely on familiarity or repeated interaction. At some point in the recent human past, a new form of economic interaction arose in the form of bilateral exchange or barter (Seabright, 2004) with an associated norm of balanced reciprocity (Sahlins, 1972). Put differently, in a market-exchange economy, reciprocity and sharing is expected only between trading partners, and no claims are made upon the community at large, unlike the norm in a gift economy.

A market economy is more likely to develop with more extensive division of labour and specialised production of goods and services because

members of the society need to interact with more individuals to procure everything they demand for their daily living. Like many important human institutions, the market economy was never designed by individuals but, rather, emerged spontaneously. As Friedrich Hayek (1979: 164) notes, 'We have never designed our economic system. We were not intelligent enough for that.' In other words, markets are 'grown' institutions that emerge and develop as conditions change to permit mutually advantageous exchange. Further, the emergence and development of markets is inexorably tied to opportunities and incentives that encourage innovation through economic competition.

4.2. Intangibles and wealth creation by corporate organisations

Human societies increase in size because of increased economic efficiency associated with division of labour that makes more effective use of knowledge held by group members. Modern economies have a wide range of business organisations, ranging from the individual entrepreneur through the mom-and-pop grocery store, small family business, partnerships, private companies and publicly traded multinationals. Within these organisations, production is planned and implemented by the owner(s) and/or their managers (Coase, 1937). That is, a business organisation is guided by management's 'visible hand' (Chandler, 1977) rather than the 'invisible hand' envisioned by Adam Smith (1776).

Business organisations compete for resources in a constantly changing business environment, and the organisations that survive are those that have best adapted to their environment, whether consciously or unconsciously (Alchian, 1950). While these organisations trade with others for goods and services on markets, they also internalise production through horizontal or vertical integration. Coase (1937) argues that the reason we don't all work and live in a single firm is that the transactions costs of organisation increase with firm size and eventually overwhelm even the most efficient managers.

In a Coasean world firms exist because they exploit opportunities to organise production and final exchange with customers in a more cost effective fashion than would be the case for a series of transactions between sub-contractors on a market. Whether a firm survives and prospers depends on whether it can locate customers and convince them to transact for a price that covers the firm's costs. In this sense, the entrepreneurial function is one of combining ideas, knowledge and information to efficiently coordinate production and deliver goods and services. Accounting plays a central role in supporting management decisions that try to guide the firm towards greater profitability

(Sombart, 1919; Littleton, 1928; Alchian, 1950). In short, the entrepreneurial role is to discover ways to exploit economic intangibles in combination with other assets to generate profits.

The main point here is that the value of intangibles to the firm is to enable wealth creation by exploiting previously unknown opportunities. Economist Thomas Schelling (1995) states this idea clearly as:

'It has become fashionable in the last two decades, not only among economists but among those who like to quote economics, to advert to an incontestable absolute truth colloquially expressed as: there is no free lunch ... I prefer the alternative truth, that there are free lunches all over waiting to be discovered or created. What I have in mind is what we call Pareto improvements, or the gains from trade. There are non-zero sum games that permeate the economy that have settled into, or have been forced into inefficient equilibria.'

Stated differently, the essential notion here is that economic benefits are best discovered by innovative organisations that exploit better ideas to create wealth. Intangibles are the basic ideas that fuel this discovery process, and their economic value is not independent of the economic setting in which these ideas will be used. Thus, a major point of relevance for accountants is: The truly important feature of intangibles is the wealth they generate, not their estimated economic value in exchange on asset markets that likely do not exist because of asset uniqueness and non-separability.

5. Recent changes in the value and importance of intangibles

We have developed a priori arguments in the three prior sections about why the exclusion of accounting intangibles from financial reporting is not likely a cause for major concern. We now shift to an empirical focus to discuss evidence on whether the role of accounting intangibles in modern economies is greater than it has been previously.

As discussed previously in Section 3, increases in accounting intangibles can result from increases in cultural intangibles that are converted into valuable economic goods and services through new ideas. Accordingly, we first discuss changes in the importance of cultural and economic intangibles. We then consider empirical evidence on the importance of accounting intangibles.

5.1. Changes in cultural intangibles

Cultural intangibles help a society survive and thrive, and result in higher measures of population success. An obvious measure of cultural intangibles is population growth, measured by taking a census, as it speaks directly to the ability of a so-

ciety to extend its members' lifespan. More broadly, it reflects a society's ability to exercise control over its environment, which allows it to extract gains from cooperation that arise through the coordination provided by organisations and market exchange (North, 2005).

Average life spans differ across human populations primarily because of large differences in death rates during childbirth and infancy rather than the small differences in the proportion of persons that live to an advanced age. Obviously, better health care increases disease survival rates at all ages and increases average life spans. Childhood and adolescent nutrition affects physical development and affects mental and physical capabilities in adulthood (Fogel, 2004). Since both physical and mental abilities are crucial to mastering even basic food-gathering technologies such as hunting, even a simple society can easily be disadvantaged by poor nutrition (Gurven et al., 2006).

Life expectancies vary considerably around the world.[13] The most developed regions, such as North America, Western Europe, Australia and Japan have the longest average life spans of 75 and higher. The developing countries of Asia, Eastern Europe and South America have average life spans in the 60s and 70s, while the underdeveloped countries of Africa lag behind, with average life spans in the 50s or less. These disparities are remarkable given expanded access to modern medical technology, and at least partially reflect political barriers to the diffusion of the fruits of such knowledge.[14]

Average life spans have evolved differently around the world during the last half century. In 1950, mean life span was nearly 70 in North America, about 65 in Europe and Oceania, in the low 50s in South and Central America, in the low 40s in Asia and North Africa, and the high 30s in Sub-Saharan Africa. Endemic tropical diseases like malaria and sleeping sickness and unfavorable climates account at least partially for Africa lagging behind the rest of the world (Diamond, 1997). Over the last 55 years, there has been considerable global convergence in average life spans with the sole exception of Sub-Saharan Africa. Average life spans grew monotonically all over the world except for a decline in Sub-Saharan Africa since the late 1980s, primarily due to the spread of AIDS. By 2005, Asia and North Africa had added more than 20 years to average life spans and had surpassed the mean life span of Europe and Oceania in 1950.

Thus, diffusion of cultural intangibles has occurred at a tremendous speed around the world, with the notable exception of Sub-Saharan Africa. Kenny (2005) reviews data on a number of other cultural intangibles, such as literacy and gender inequality, and finds that most indicators around the

world have converged throughout the 20th century.[15] Rosling (2006, 2007) demonstrates, using UN data, how closely measures of cultural innovation, such as child survival rates, correlate with measures of economic innovation, such as per capita GDP both over time and around the world. Rosling also demonstrates that socio-cultural indicators have converged more rapidly than economic indicators, suggesting that economic innovation tends to lag cultural diffusion.[16]

The growth in cultural intangibles can be quantified in economic values. Murphy and Topel (2006) estimate that the cumulative gains in longevity over the 20th century were worth about $1.2 million per person for both men and women (based on US individuals' willingness to pay). Between 1970 and 2000, increased longevity added about $3.2 trillion per year to US national wealth, equal to about half of average annual GDP over the period. Thus, the evidence suggests that considerable improvements in cultural intangibles have occurred over the course of the past century.

5.2. Changes in economic intangibles

Economic intangibles are ideas that can be converted into valuable goods and services for consumption either directly or indirectly. The World Bank (2006) recently published a millennium capital assessment with monetary estimates of the

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[13] The discussion in the next two paragraphs is based on life expectancy data for 1950–2005 in *World Population Prospects: The 2006 Revision, Highlights*, available online at: http://esa.un.org/unpp/index.asp?panel=2.

A map of life expectancies for different countries in 2005–2010 is available in United Nations, Department of Economic and Social Affairs, Population Division (2007: Figure 7), and a map of life expectancies in 2005 using the same data is available at: http://www.worldpolicy.org/projects/globalrights/econrights/maps-life.html.

United Nations, Department of Economic and Social Affairs, Population Division (2007: Figure 5) presents a graph displaying the evolution of life expectancies for different geographic regions from 1950–2005.

[14] Until a few years ago, Western countries propagandized against the spraying of DDT to prevent endemic malaria in Africa (Sidley, 2000; World Health Organisation, 2006); and even today, the European Union threatens economic sanctions against developing African countries that import genetically modified grains (Clapp, 2005; Paarlberg, 2008) that would improve nutrition (Trewavas, 2001; Miller and Conko, 2004). South African President Thabo Mbeki long resisted the scientific link between HIV and AIDS, and withheld retroviral AIDS drugs from the populace even though they were provided free or cheaply by the major international drug companies (Schneider and Fassin, 2002; Power, 2003).

[15] Kenny (2005) also examines data on life expectancy for England and India going back to the 13th century, and finds that divergence in this measure started as early as the 15th century and continued through the 19th century before reversing near the start of the 20th century.

[16] Our reviewer pointed out that the demographic transition to smaller family sizes occurs after a population reaches high per capita GDP, indicating that economic intangibles can lead to at least some cultural intangibles.

types of assets – natural, produced and intangible – for 120 countries as of 2000. Because many of these assets were not traded, the World Bank developed estimates of asset values by capitalising the income being generated by these assets. The World Bank's (2006: 5–6) methodology is:

'Total wealth, in line with economic theory, is estimated as the present value of future consumption. Produced capital stocks are derived from historical investment data using a perpetual inventory model (PIM). Natural resource stock values are based upon country-level data on physical stocks, and estimates of natural resource rents are based on world prices and local costs. Intangible capital then is measured as the difference between total wealth and the other produced and natural stocks.'

The central finding, anticipated by Adam Smith, is that intangible assets are the most important category, averaging 78% of worldwide assets.[17] Intangible capital comprises 59% of assets in low-income countries, 68% in middle-income countries and 80% of assets in high-income OECD countries.[18] Produced capital comprises 18% of worldwide assets, and has a similar share across income levels, ranging from 16% in low-income countries to 19% in high-income countries. Natural capital comprises 26% of assets in low-income countries (even excluding the oil states of the Middle East), 13% in middle-income countries, and a meager 2% in high-income OECD countries. While natural capital is only 2% of wealth in high-income OECD countries, natural capital per capita in high-income countries ($9,531) is still five times that in low-income countries ($1,925). The per capita disparity in intangible assets is even greater: high-income country citizens ($353,339) have *80 times* the intangible assets of low-income country citizens ($4,434). Thus, high-income countries have considerably more assets of all types, generating much greater gross national income.

The World Bank (2006) breaks down the estimated intangible capital into human capital (raw labour and unskilled labour), formal and informal institutions (governance and social capital), foreign financial assets, and measurement error (for total, produced or natural capital). The World Bank (2006: Table 1.3) measures several proxies for each of these components, and finds that three proxies, years of schooling (human capital), rule of law index (institutions) and foreign remittances per capita (foreign assets), together explain 89% of the cross-country variation in intangible assets per capita. With an elasticity of 0.83, the rule of law is the single most important component of intangible capital variation.[19] Hall and Jones (1999) also conclude that social capital is the most important source of cross-country productivity differences. Education is the second most important component of intangible capital, with an elasticity of 0.53, while foreign remittances have an elasticity of 0.12. These estimates are important because they reveal that the most important intangible assets across countries are either not owned (rule of law) or owned by workers (human capital) and not by firms. Thus, business organisations in high-income countries have higher valuations largely because their tangible assets enjoy the complementarities and synergies of these more valuable intangibles.

The World Bank (2006: Table 1.4) also estimates marginal returns to each of these intangible asset components in different countries. It finds that individual components of intangible capital have much larger returns in rich countries than poor countries (seven- to eight-fold impact in high- vs. middle-income countries), which results from both higher levels of each of these assets and higher complementarities between these assets. Thus, the same level of investment can have vastly different economic values across countries. For example, a computer programmer from India (high human capital) has vastly different value added in the US vs. India, even holding direct investment in education or cost constant.

The World Bank (2006) likely underestimates the proportion of wealth attributable to intangibles. The World Bank estimates the current net present value (NPV) of natural and produced capital, but does not recognise that absent prior intangibles these would be much less valuable. The value of natural resources depends on demand for them, which in turn depends on uses that have been invented for them. Until recently, natural gas emerging from oil wells used to be flared off as waste until liquefaction technology enabled easier use and created economic wealth. Natural resources can also lack value because they cannot be brought to market – North Sea oil was valueless until deep-sea oil production technology was developed. Thus, as Adam Smith long ago argued, even the value of tangible assets emanates largely from

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[17] Smith (1776) starts his Introduction by saying: 'The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes.' Smith recognised 'the skill, dexterity, and judgment with which [. . .] labour is generally applied' as a precondition for generating supply 'whatever be the soil, climate, or extent of territory of any particular nation.'

[18] The point estimate of 80% for OECD countries is quite similar to Solow's (1957) estimate that seven-eighths of US productivity growth in the first half of 20th century was due to technological change.

[19] The elasticity measures the percentage change in intangible assets for a 1% change in a given proxy. Thus, a 1% change in rule of law index between countries is associated with a 0.83% change in intangible assets per capita.

ideas (i.e. *tangible assets embed intangibles*).

While the World Bank emphasises political and economic institutions, we note that social norms and conventions also affect the growth of economic intangibles. For instance, social constraints and occupational restrictions at birth, for example, in the historical Indian caste system, can discourage the pursuit of individual interests. North et al. (2006) argue that open-access societies encourage the flow of human capital between occupations, and all else being equal, are more likely to reward the young geniuses and master craftsmen whose innovations increase societal wealth. This surplus wealth in turn allows for the development of science and seemingly irrelevant products, like artwork, that emerge initially from hobbies (Jardine, 1996; Roberts, 2005; Szabo, 2005). To summarise this subsection, the production of valuable economic intangibles depends heavily on a host of cultural, social, political, and economic institutions, few of which are owned or controlled by individual firms.

5.3. Changes in accounting intangibles

Accounting intangibles are legal rights to exclusively exploit an idea to generate cash inflows, and include patents, trademarks and copyrights. Accounting intangibles that are purchased in arm's length transactions are reported at acquisition values. However, most intangibles are internally developed, and because firms frequently use informal mechanisms such as trade secrets and marketing to protect their ideas, they cannot report these assets on the balance sheet.[20] Even if legally protected, firms frequently report these assets on their balance sheets at historical costs or nominal amounts rather than at their market values. While US accounting academics usually attribute this conservative accounting to the expensing of R&D

expenditures mandated by SFAS 2 (FASB, 1975), the US practice of reporting valuable intangibles at conservative nominal values such as $1 goes back at least as far as General Electric's balance sheet of 1907 (Ely and Waymire, 1999b; Waymire and Basu, 2008). In addition, intangibles are potentially more susceptible to obsolescence or legal challenge, and their market values are more likely to be state-dependent. Reported balance sheet values thus can be unreliable guides to the value or importance of accounting intangibles.[21]

An obvious alternative to balance sheet measurements is to value intangibles based on the accounting income they produce. Graham and Meredith (1937: 23) state this view as:

'In general, it may be said that little if any weight should be given to the figures at which intangibles assets appear on the balance sheet. Such intangibles may have a very large value indeed, but it is the income account and not the balance sheet that offers the clue to this value. In other words, it is the earning power of these intangibles, rather than their balance sheet valuation, that really counts.'

Intangibles usually generate income indirectly through other assets and jointly with other intangibles. Nordhaus (2004) estimates that on average inventors capture less than 3% of the societal benefits of their inventions. Customers, imitators and other industry participants usually capture the remaining benefits. Teece (1987) argues that under a 'weak appropriability regime', most profits go to the owners of specialised complementary assets needed to commercialise an invention. The strength of the appropriability regime is a function of the strength of legal protections such as patents, trademarks and copyrights (Teece, 1987); as well as innovation characteristics – whether the knowledge is tacit or codified, observable or non-observable in use, and whether it requires tangible assets or not (Teece, 2003).

As discussed in the previous section, many valuable intangibles, such as rule of law, are not owned by individual firms but instead are shared by all citizens, and others, such as human capital, are owned by employees and only rented by firms.[22] Valuing accounting intangibles on a stand-alone basis requires heroic assumptions about separability, highly uncertain estimates of ambiguous future benefits, and arbitrary allocations of jointly produced income. We question whether the often expressed need to value and report intangibles on balance sheets is inherently a mirage that leads down a path involving high measurement costs for something that is not the focus of economic activity. In other words, since intangibles are usually generated and used internally, and their complementarity with other firm intangibles implies that

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[20] In a few special cases, such as well-recognised brands, internally developed intangibles can be reported at appraised values (IAS 38: IASC, 1998), although this is not permitted in the US.

[21] Neither Adobe nor Microsoft has ever capitalised any software development costs under SFAS 86 (FASB, 1985). Similarly, large US oil and gas companies prefer to expense rather than capitalise exploration costs, unlike their smaller competitors, when firms could choose between the successful efforts and full cost methods. This suggests that successful companies report nominal balance sheet values for intangibles to signal their financial strength, and statistical analyses including these companies are likely to find a low or even negative correlation between reported intangible amounts and their market values.

[22] Advocates of capitalising human capital often point to the $2.2 billion increase in Kodak's market capitalisation after it hired Christopher J. Steffen as Chief Financial Officer in 1993. Unfortunately for Kodak, he resigned after 11 weeks, at which point the market value quickly shrank by over $2 billion (Merchant, 2006: 898–899). This example reinforces the point that human capital is not owned by the firm but merely rented.

Figure 2
Tobin's q for the US stock market 1950–2006
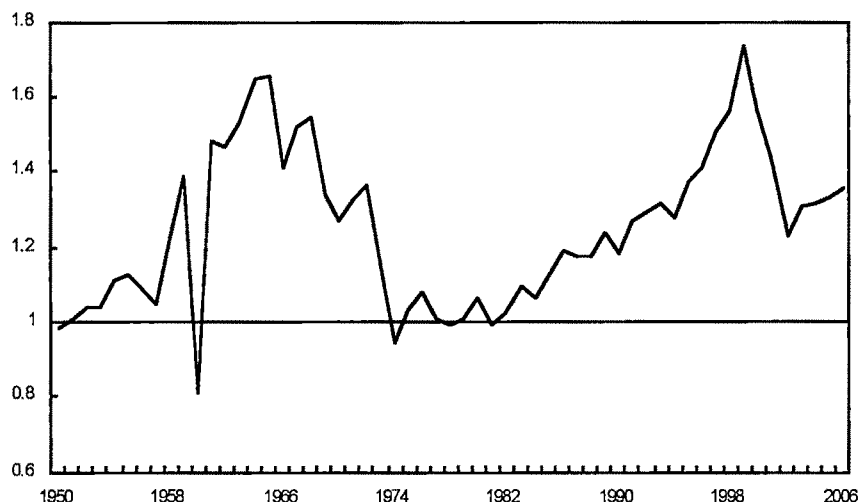
The graph shows the market-wide Tobin's q statistic for the US stock market for the years 1950 to 2006. The market-wide Tobin's q is calculated from data available on Compustat. Following Gompers, Ishii and Metrick (2003), each firm's q is the market value of assets divided by the book value of assets (Compustat data item 6), where the market value of assets is computed as book value of assets plus the market value of common stock less the sum of the book value of common stock (Compustat data item 60) and balance sheet deferred taxes (Compustat item 74). The market value of common stock is computed as the Common Shares Outstanding (Compustat item 25) multiplied by Price – Fiscal Year – Close (Compustat item 199). These firm-specific values were then averaged for a given year based on fiscal year data. We used a weighted average based on market values.

going concern values are likely quite different from liquidation values, most valuations will necessarily be highly subjective and inaccurate, and ignored by market participants. In this sense, World Bank estimates of the wealth of different nations are merely adaptations of the longstanding view that accurate valuations of business organisations are based on the income they produce rather than 'values' attributed to their unique use of a combination of assets.

Given the balance sheet measurement problems, academic researchers have resorted to indirect measures to illustrate the importance of accounting intangibles. Baruch Lev (2001: 8), for example, pointed to the S&P 500 market-to-book ratio of equity of 6 in March 2001 as evidence that accounting intangibles were both highly important and poorly accounted for, assuming that the missing book values were all due to unrecorded accounting intangibles. Figure 2 shows the time series of Tobin's q for US firms from 1950 to 2006. In this graph, the market-to-book ratio of assets peaks at over 1.7 in the late 1990s, having risen dramatically from about 1.2 in the early 1990s. However, the graph also indicates that the market-to-book ratio exceeded one for some time in the 1960s, indicating that the 1990s values were

not unique. Furthermore, even though the market-to-book ratio was near one for much of the 1970s, following the 1973 oil crisis, it is difficult to believe that firms such as Coca-Cola or Kodak did not have valuable accounting intangibles in that era.

In retrospect, an alternative interpretation of Figure 2 is that the high market-to-book values of the 1990s resulted from a market bubble in Internet stocks, and in high-technology firms more generally. Warren Buffett pointed out at the time that the 1990s were reminiscent of the 1920s electricity, automobile and chemicals boom. Studying the US automobile industry, Carroll and Hannan (2000: 347) found 'that an astonishing number of hopeful producers populated the early industry' and that 'much selection occurred prior to actual production'. They identify 3,485 preproduction organising attempts in the automobile industry. Of these, only 11% succeeded in making the transition to the production stage. This evidence is similar to the low success rates for pharmaceutical initial public offerings in the late 20th century.

Jovanovic and MacDonald (1994) describe the evolution of the US automobile tyre industry during the first half of the 20th century. Similar to the automobile industry, there was a rapid increase in the number of automobile tire manufacturers be-

tween 1910 and 1920 that followed the rising industry share price relative to the market index. However, the number of tyre manufacturers fell precipitously after the mid-1920s, lagging a few years after the industry share prices. Over time, the number of manufacturers continued to drop even as total sales climbed. Their Figure 1 illustrates a 'winner takes all' pattern that often characterises the advent of new technologies. The extreme positive skewness of returns to tire manufacturing was similar to the returns realised by information technology firms in the 1990s. Gort and Klepper (1982) show that the introduction of many major new technologies generated similar industry patterns. In winner-take-all situations where most firms are likely to entirely lose their investments, it is arguably more informative to report these intangible investments at their most likely value of zero rather than an unrepresentative mean or average value.

But even ignoring the issue of technological change, we suggest that a more plausible reason for the variation in market-to-book ratios over time is changes in the value of non-accounting economic intangibles, such as improvements in government functioning and the impact of deregulation. Market valuations reflect the income expected to be generated by the firm's owned assets in conjunction with those assets that they share with other firms in the industry or the economy (e.g. government protection from competition via tariffs or selective regulation). In other words, it may not even be the firm's own assets that generate the added value.

Another piece of evidence that Lev (2001: 100) presents is a graph from Lev and Zarowin (1999) showing a declining earnings-return correlation from 1980–1995 as measured by R^2s. Lev and Zarowin (1999), among others, argue that this R^2

decline indicates the increased importance of intangibles because current GAAP requires the immediate expensing of valuable investments. Ely and Waymire (1999a: Figure 1) show the earnings-return R^2 for a randomly chosen sample of 100 NYSE-listed firms for each year from 1927 to 1993. Consistent with Lev and Zarowin, Ely and Waymire (1999a) document that earnings and change in earnings explain about 20% of variation in stock returns across firms in the mid-1980s but close to zero by the early 1990s.

However, Ely and Waymire (1999a) also demonstrate that the decreasing trend during the 1990s was part of a broader FASB era decline, and the FASB era decline resembles an earlier decline under CAP during the 1940s and 1950s, again suggesting that the 1990s were not an aberration in relation to a longer time series. A subsequent study by Ryan and Zarowin (2003) finds that virtually all of the post-1950 decline in R^2 is due to (1) the stock market becoming more efficient (lower trading costs, etc.) and (2) increased accounting conservatism (a more non-linear relation between earnings and returns), and that increasing intangibles do not explain these trends. In sum, academic accounting research provides little evidence to support the argument that the average value of accounting intangibles has increased disproportionately in recent years.

There is evidence to suggest that the *number* of accounting intangibles has increased over time, but it is unclear whether this translates into more valuable accounting intangibles. The World Intellectual Property Organisation (WIPO, 2007) has recently collated and published data on patent and trademark filings and grants from patent offices around the world.[23] WIPO (2007: 11) shows the time series of worldwide patent filings for nine patent offices starting in 1883 and ending in 2005. Worldwide patent filings grew at a 1.99% rate from 1883 to 1959, with growth being most pronounced for the US, Germany, the UK and France. From 1960 to 2005, worldwide patent filings grew by 3.35% annually, largely because of increases in Japan and Russia. Growth during 1995–2005 was even greater, at 4.7% per year, with the most rapid growth occurring in South Korea and China.[24] As of 2005, patents are still highly concentrated, with 77% of filings and 74% of grants accounted for by five patent offices (China, Japan, European Patent Office, the Republic of Korea and the US). Thus, patent activity is concentrated in industrialised countries, similar to the pattern for economic and cultural intangibles described in Sections 5.1 and 5.2.[25]

Data trends for trademark application filings worldwide from 1883–2005 are similar to those described above for patents.[26] Trademark applications worldwide grew at 4% per year from 1883 to

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[23] Nard and Morriss (2006) use a public choice perspective to analyse the history of patent law from its beginnings in the Venetian patent statute of 1474 through the English 1624 Statute of Monopolies to the Intellectual Property clause of the US Constitution and the US Patent Act of 1790. Nicita and Ramello (2007) review the history of copyright law beginning with the English Statue of Queen Anne of 1710.

[24] While some of this growth is due to multiple patent applications in different jurisdictions, the European Patent Convention in 1977 and the International Patent Cooperating Treaty in 1978 have reduced some duplication. Patent counts are also affected by legal and administrative differences between national and regional patent systems, although these systems are converging due to international treaties and agreements. Alternatives to standard patent applications, such as provisional applications, utility models or industrial designs, may result in fewer standard patent applications in some countries.

[25] Of the estimated 5.6 million patents in force at the end of 2005, Japanese and US entities owned 49%. Japan and South Korea have far and away the highest number of patent filings per capita or per unit of GDP (measured in constant year 2000 US dollars at purchasing power parity).

[26] http://www.wipo.int/ipstats/en/statistics/marks/applications/office.html.

1959, and at 5.4% per year from 1960 to 2005. As with patents, trademark applications were concentrated in Europe, Japan and the US up to 1960. South Korea and China began trademark filings in 1963 and 1982, respectively, and quickly moved up the international rankings, with China in recent years having more than twice as many trademark applications as any other country. Both the trademark and patent filings data indicate that the number of accounting intangibles is trending up through time.[27]

At the same time, an increase in the frequency of patent and trademark filings does not automatically translate into valuable intangibles, especially for developing country filings. Moser (2004) finds that countries with patent systems (and those with longer patent terms) were no more innovative than countries without patent systems in the mid-19th century, as measured by the number of innovations per country judged important by experts at World Fairs during 1851–1876. The WIPO data clearly suggests that patents, trademarks and other accounting intangibles tend to accompany industrialisation and economic development, and may in large part reflect improved legal institutions rather than acceleration in the number or value of economic or cultural intangibles. As a result, accounting intangibles may not have become dramatically more important *relative* to economic or cultural intangibles, although there is considerable regional variation.

Moreover, there are reasons to believe that overly broad patent law can hinder innovation (Jaffe and Lerner, 2006). Jaffe and Lerner (2006: 2) argue that the new US Court of Appeals for the Federal Circuit (CAFC) 'interpreted patent law to

make it easier to get patents, easier to enforce patents against others, easier to get large financial awards from such infringements, and harder for those accused of infringing patents to challenge the patents' validity.'[28] As a result, US patents have been granted for obvious or long-existing ideas such as 'Method for Swinging on a Swing' to a five-year-old, 'one-click shopping' to Amazon.com, and an 'expirationless option' to MBA Virgil Daugherty for Paul Samuelson's research two decades earlier (Jaffe and Lerner, 2006). These US developments are important because of an international covergence effort starting with the 1994 international agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which is strongly influenced by the US system.[29]

Many of the new patent filings may actually overlap with existing patents. Heller and Eisenberg (1998) argue that the large number of overlapping patent grants creates an 'anticommons' problem that will slow down biomedical research because innovators are increasingly wary of being asked for onerous royalty payments or facing costly patent litigation. Jaffe and Lerner (2006: Figure 2) show that patent litigation has increased dramatically since 1982. Bessen and Meurer (2008) estimate that except for the pharmaceutical and chemical industries, US publicly traded firms in the last decade on average experienced a net wealth reduction if they filed patents because of patent litigation. US accounting standard-setters should develop standards for patent liabilities (similar to asset retirement obligations) if they want to stay true to their favoured balance sheet approach! Non-meritorious product litigation is, of course, a much broader danger to product innovation in the US (Jaffe and Lerner, 2006).[30]

Even if valuable economic intangibles are more prevalent today, accounting intangibles may not have similarly increased because of changes in social norms regarding sharing of ideas and intangibles. Large parts of the software industry are organised under a communitarian 'open source' or 'free software' or 'copyleft' model that has produced major software innovations such as Netscape, Linux and Apache. These innovations are deliberately unprotected under intellectual property law and compete with copyrighted or patented software. From an economic perspective, these arrangements would reduce the value of accounting intangibles actually reported on balance sheets. The illegal sharing of music and videos using Napster and YouTube makes it more difficult to collect royalties but also facilitates viral marketing, making their net impact on the value of intangibles difficult to predict (Liebowitz, 2005; Varian, 2005).

A final perspective on the importance of intangibles is that despite rapid growth after World War II

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[27] WIPO also compiles worldwide data on utility models, petty patents, industrial designs, plant varieties and microorganisms, but the patent and trademark data is likely to capture the most important accounting intangibles.

[28] The Bayh-Dole Act of 1980 encouraging universities to patent federally funded research and then license the patents (Rai and Eisenberg, 2003). In the early 1990s, Congress made the US Patent and Trademark Office (PTO) self-financing, creating incentives to loosen patenting standards to increase application fees.

[29] Contrary to popular opinion and the business press, US movie producers lose far more to piracy per capita in developed countries like the US, Canada and the European Union than they do in developing countries like China, Russia and India (Schwabach, 2007). It is ironic that the US is so militantly pursuing intellectual property piracy when it was itself one of the biggest offenders until very recently.

[30] Onerous government regulation can also have negative consequences for the rate of innovation in an economy. For example, Peltzman (1973) argues that restrictive FDA regulation has overly slowed the introduction of new drugs in the US and imposed large welfare losses as a result. Gieringer (1985: 188) estimates, 'At this rate, it follows that a one-year delay in new drug benefits would cost 37,000 to 76,000 lives per decade in the US population ... By comparison, FDA delays in approving new drugs have often been estimated at two years or more.'

in education and R&D investments, economic growth has not increased in the US or the OECD countries (Jones, 1995). In cross-country regressions, intellectual property rights have little impact on economic growth even though general property rights institutions have a substantial impact (Bessen and Meurer, 2008). These observations are consistent with the 'burden of knowledge' argument that innovation is becoming more difficult as the body of knowledge requiring mastery continues to expand (Jones, 2007b), with new innovations being narrower and providing smaller advances than before (Andolfatto and MacDonald, 1998). This evidence is consistent with the view that all factors of production, even knowledge, are subject eventually to the law of diminishing marginal returns.

6. Conclusions

We analyse accounting intangibles from a broad historical and international perspective, arguing that a narrow focus on particular time periods or regions often leads to a woefully incomplete view of intangibles. Our analysis indicates that human societies have produced useful ideas for thousands of years all around the world, and that the knowledge assets labelled as intangibles are ubiquitous to human economic interaction. Thus, analysing whether accounting intangibles have become more important recently requires examining a broad set of benchmarks for comparison.

We analyse the process by which cultural ideas become converted into valuable economic goods and services and eventually into legally protected property rights that can be reported as accounting intangibles. We find that few ideas attain the status of private property rights, even in developed countries, which reflects social norms for sharing as well as slowly developing property-rights technology. In addition, companies may prefer to ostentatiously undervalue intangible assets on their balance sheets to signal their economic soundness. As a result, the importance of reported accounting intangibles might not track the importance of the broader sets of cultural and economic intangibles.

Accounting intangibles, because they usually improve pre-existing tangible goods and services, are also not separable from the other concurrent intangibles incorporated into these tangible assets, or even the past innovations that led to the creation of these assets. Similarly, many intangibles will be incorporated into many as yet undeveloped future

tangible assets.

Ideas are economically valuable if they increase the wealth of those using them, which implies that the value of intangibles derives from the income they produce. However, intangibles usually generate income indirectly through other tangible assets, or jointly with other intangibles that are often owned by others, and are often rendered obsolete by unpredictable technological advances. Many complementary intangibles, such as rule of law, are not owned by any single entity but instead are shared, and others, such as human capital, are owned by employees and only rented by firms. Stand-alone valuations of accounting intangibles thus require heroic assumptions about separability, highly uncertain estimates of ambiguous future benefits, and arbitrary allocations of jointly produced income both within and across firms.

Our analysis implies that accounting practice has evolved well-functioning norms and practices for reporting intangibles. The few ideas that are securely protected by property rights and have values authenticated by market exchange are reported at acquisition values. In a few other cases, such as well-recognised brands, they can be reported at appraised values, but the more usual practice is to report intangibles at historical cost with the tacit understanding that these are lower bounds on their market values. Because the income statement ultimately captures all wealth generation regardless of source, reported income provides the single most important input to forecasting future income and estimating a firm's intrinsic value (Liu et al., 2007).

While standard-setters may be tempted to leave their mark upon posterity by altering accounting practice for intangibles, our analysis suggests that they, like Don Quixote, are likely tilting at windmills. Ferguson (1767) pointed out that many human institutions such as the market economy are 'the result of human action, but not the execution of any human design', and that frequently the former are superior. Because accounting practice like language and the market system has evolved along with the human mind, it incorporates far more information and evolves in a more complex manner than any single regulator, or even a committee of regulators, could begin to possibly comprehend (Hayek, 1979). Businesses that follow accounting rules that have been filtered through successive generations tend to survive and prosper, even though their managers and owners may not realise why (Byrne, 1937). Just as valuable innovation in science or technology is best accomplished by individual trial and error rather than by regimented lock-step dogma, so accounting standard-setters could likely better serve the public interest by letting market processes select appropriate accounting for intangibles.[31] Using simplistic and naïve

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[31] Two days after our presentation at the Information for Better Markets conference on 17 December, 2007, the FASB decided not to add a project on intangible assets to its agenda. See: http://www.fasb.org/action/aa122807.shtml. The IASB also decided not to add a project on intangible assets to its agenda in December 2007. See: http://www.iasplus.com/agenda/agenda.htm.

conceptual frameworks to regulate complex adaptive systems, like financial markets and accounting practices, is likely a recipe for negative unintended consequences.

References

Alchian, A. A. (1950). 'Uncertainty, Evolution and Economic Theory'. *Journal of Political Economy*, 58 (3): 211–221.

Andolfatto, D. and MacDonald, G. M. (1998). 'Technology Diffusion and Aggregate Dynamics'. *Review of Economic Dynamics*, 1: 338–370.

Appenzeller, T. (1998). 'Evolution or revolution?'. *Science*, 282 (5393): 1451–1454.

Bairoch, P. (1988). *Cities and Economic Development*. trans. C. Braider, Chicago, IL: University of Chicago Press.

Bessen, J. E. and Meurer, M. J. (2008). 'Do Patents Perform Like Property?'. Working Paper, Boston University School of Law. http://ssrn.com/abstract=1103143.

Blair, M. M. and Wallman, S. M. H. (2001). *Unseen Wealth: Report of the Brookings Task Force on Intangibles*. Washington, D.C.: Brookings Institution Press.

Boulding, K.E., Pfaff, M. and Horvath, J. (1972). 'Grant economics: a simple introduction'. *American Economist*, 16 (1): 19–28.

Buchanan, J. and Tullock, G. (1962). *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Ann Arbor, MI: University of Michigan Press.

Buchanan, J. M. and Yoon, Y. J. (2000). 'Symmetric Tragedies: Commons and Anticommons'. *Journal of Law and Economics*, 43 (1), April: 1–13.

Burgelman, R.A., Maidique, M.A. and Wheelwright, S.C. (2001). *Strategic Management of Technology and Innovation*, Boston: McGraw Hill/Irwin.

Burriss, E. E. (1929). 'The Nature of Taboo and Its Survival in Roman Life'. *Classical Philology*, 24 (2): April, 142–163.

Byrne, G. (1937). 'To What Extent Can the Practice of Accounting be Reduced to Rules and Standards?' *Journal of Accountancy*, 64 (5): November: 364–379.

Carroll, G. and Hannan, M. (2000). *The Demography of Corporations and Industries*. Princeton, NJ: Princeton University Press.

Chanda, N. (2007). *Bound Together: How Traders, Preachers, Adventurers and Warriors Shaped Globalization*, CT: Yale University Press.

Chandler, A. (1977). *The Visible Hand*. Cambridge, MA: Belknap Press.

Clapp, J. (2005). 'The Political Economy of Food Aid in an Era of Agricultural Biotechnology'. *Global Governance*, 11: 467–485.

Coase, R. (1937). 'The Nature of the Firm'. *Economica*, 4 (16), November: 386–405.

Coase, R. (1960). 'The Problem of Social Cost'. *Journal of Law and Economics*, 3: October, 1–44.

Dawkins, R. (1976). *The Selfish Gene*. Oxford, UK: Oxford University Press.

De Soto, H. (1989). *The Other Path: The Economic Answer to Terrorism*. New York, NY: Basic Books.

De Soto, H. (2000). *The Mystery of Capital: Why Capitalism Succeeds in the West and Fails Everywhere Else*. New York, NY: Basic Books.

Diamond, J. (1997). *Guns, Germs, and Steel: The Fates of Human Societies*. New York, NY: W.W. Norton and Co.

Diamond, J. (2004). *Collapse: How Societies Choose to Fail or Succeed*. Viking.

Donald, M. (1991). *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition*. Cambridge, MA: Harvard University Press.

Dunbar, R. (2001). 'Brains on two legs: Group size and the evolution of intelligence'. In *Tree of Origin*. F. B. M. de Waal, ed., Cambridge, MA: Harvard University Press.

Eccles, R. G., Herz, R. H., Keegan, E. M. and Malone, M. S. (2001). *The Value Reporting Revolution: Moving Beyond the Earnings Game*. New York, NY: Wiley.

Edvinsson, L. and Malone, M. S. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. London: Harper Collins.

Ely, K. and Waymire, G. (1999a). 'Accounting standard-setting organizations and earnings relevance: longitudinal evidence from NYSE common stocks, 1927–93'. *Journal of Accounting Research*, 37 (2), Autumn: 293–317.

Ely, K. and Waymire, G. (1999b). 'Intangible assets and stock prices in the pre-SEC era'. *Journal of Accounting Research*, 37 (Supplement): 17–44.

Fauchart, E. and von Hippel, J. (2006). 'Norms-based intellectual property systems: The case of French chefs'. MIT Sloan working paper 4576-06. http://ssrn.com/abstract=881781.

Ferguson, A. (1767). *An Essay on the History of Civil Society*. Re-issued 1966, Edinburgh, UK: Edinburgh University Press.

FASB (1975). *Statement of Financial Accounting Standards No. 2: Accounting for Research and Development Costs*, Norwalk, CT: Financial Accounting Standards Board.

FASB (1985). *Statement of Financial Accounting Standards No. 86: Accounting for the Costs of Computer Software to be Sold, Leased or Otherwise Marketed*, Norwalk, CT: Financial Accounting Standards Board.

FASB (2001). *Statement of Financial Accounting Standards No. 141: Business Combinations*, Norwalk, CT: Financial Accounting Standards Board.

Fogel, R. W. (2004). *The Escape from Hunger and Premature Death, 1700–2100: Europe, America and the Third World*. New York, NY: Cambridge University Press.

Frye, T. and Shleifer, A. (1997). 'The Invisible Hand and the Grabbing Hand'. *The American Economic Review*, 87 (2), May: 354–358.

Galenson, D. W. (2005). *Old Masters and Young Geniuses: The Two Life Cycles of Artistic Creativity*. Princeton, NJ: Princeton University Press.

Gieringer, D. H. (1985). 'The Safety and Efficacy of New Drug Approvals'. *Cato Journal* 5 (1): 177–201.

Gompers, P. A., Ishii, J. L. and Metrick, A. (2003). 'Corporate Governance and Equity Prices'. *Quarterly Journal of Economics*, 118 (1), February: 107–155.

Gort, M. and Klepper, S. (1982). 'Time paths in the diffusion of product innovations'. *The Economic Journal*, 92 (367): 630–653.

Graham, B. and Meredith, S. (1937). *The Interpretation of Financial Statements*. New York, NY: Harper and Row Publishers, Inc.

Gurven, M., Kaplan, H. and Gutierrez, M. (2006). 'How long does it take to become a proficient hunter? Implications for the evolution of extended development and long life span'. *Journal of Human Evolution*, 51(5): 454–470.

Hall, R. E. and Jones, C. I. (1999). 'Why do some countries produce so much more output per worker than others?' *Quarterly Journal of Economics*, 114 (1), February: 83–116.

Hayek, F. A. (1945). 'The Use of Knowledge in Society'.

American Economic Review, 35 (4): 519–30.

Hayek, F. (1968). 'Competition as a discovery procedure'. in *New Studies in Philosophy, Politics, Economics, and the History of Ideas*, Chicago, IL: University of Chicago Press: 179–190.

Hayek, F. A. (1979). *Law, Legislation and Society, Volume 3: The Political Order of a Free People*. Chicago, IL: University of Chicago Press.

Heller, M. A. and Eisenberg, R. S. (1998). 'Can Patents Deter Innovation? The Anticommons in Biomedical Research'. *Science*, 280 (5364): 698–701.

Holden, C. (1998). 'No last word on language origins'. *Science*, 282 (5393): 1455–1456.

ICAEW (1998). *Corporate Governance: The 21st Century Annual Report*, London: Institute of Chartered Accountants of England and Wales.

IASB (2004). *International Financial Reporting Standard No. 3: Business Combinations*. London: International Accounting Standards Board.

IASC (1998). *International Accounting Standard No. 38: Accounting for Intangibles*. London: International Accounting Standards Committee.

Jacobs, J. (1969). *The Economy of Cities*. New York, NY: Random House.

Jacobs, J. (1984). *Cities and the Wealth of Nations: Principles of Economic Life*. New York, NY: Random House.

Jaffe, A. and Lerner, J. (2006). 'Innovation and its Discontents'. *Capitalism and Society* 1 (3): Article 3. http://www.bepress.com/cas/vol1/iss3/art3/

Jardine, L. (1996). *Worldly Goods: A New History of the Renaissance*. New York, NY: Nan A. Talese.

Jones, B. F. (2007a). 'Age and Great Inventions'. Working Paper, Northwestern University and NBER, March. http://www.kellogg.northwestern.edu/faculty/ jones-ben/htm/AgeAndGreatInvention.pdf.

Jones, B. F. (2007b). 'The Burden of Knowledge and the 'Death of the Renaissance Man: Is Innovation Getting Harder?'. Working Paper, Northwestern University and NBER, July. http://www.kellogg.northwestern.edu/ faculty/jones-ben/htm/BurdenOfKnowledge.pdf.

Jones, C. I. (1995). 'Time series tests of endogenous growth models'. *Quarterly Journal of Economics*, 110 (2): May, 495–525.

Jovanovic, B. and MacDonald, G. M. (1994). 'The Life Cycle of a Competitive Industry'. *The Journal of Political Economy*, 102 (2), April: 322–347.

Kelley, A. C. (1972). 'Scale Economies, Inventive Activity, and the Economics of American Population Growth'. *Explorations in Economic History*, 10 (1): 35–72.

Kenny, C. (2005). 'Why Are We Worried About Income? Nearly Everything that Matters is Converging'. *World Development*, 33 (1): 1–19.

Kleiner, M. M, (2006). *Licensing Occupations: Ensuring Quality or Restricting Competition?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Kremer, M. (1993). 'Population Growth and Technological Change: One Million B.C. to 1990'. *The Quarterly Journal of Economics*, 108 (3), August: 681–716.

Kuznets, S. (1966). *Modern Economic Growth: Rate, Structure and Spread*. Yale University Press, New Haven.

Laitner, J. and Stolyarov, D. (2003). 'Technological Change and the Stock Market'. *American Economic Review*, 93 (4), November: 1240–1267.

Leadbeater, C. (1999). *Living on Thin Air: A New Economy*. Viking.

Lev, B. (2001). *Intangibles: Management, Measurement, and Reporting*. Washington, D.C.: Brookings Institution Press.

Lepowsky, M. (1987). 'Food taboos and child survival: A case study from the Coral Sea': 71–93 in Scheper-Hughes, N. (ed.), *Child Survival: Anthropological Perspectives on the Treatment and Maltreatment of Children*. Dordrecht, Holland: D. Riedel Publishing Co.

Lev, B., and Zarowin, P. (1999), 'The boundaries of financial reporting and how to extend them'. *Journal of Accounting Research*; 37 (2), Autumn: 353–385.

Liebowitz, S. J. (2005). 'Economists' Topsy-Turvy View of Piracy'. *Review of Economic Research on Copyright Issues*, 2 (1): 5–17.

Litan, R. E. and Wallison, P. J. (2000). *The GAAP Gap: Corporate Disclosure in the Internet Age*. Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies.

Littleton, A.C. (1928). 'What is profit?' *The Accounting Review*, 3 (3): 278–288.

Littleton, A.C. (1929). 'Value and price in accounting'. *The Accounting Review*, 4 (3): 147–154.

Littleton, A.C. (1935). 'Value or cost'. *The Accounting Review*, 10 (3): 269–273.

Littleton, A.C. (1952). 'Significance of invested cost'. *The Accounting Review*, 27 (2): 167–173.

Liu, J., Nissim, D. and Thomas, J. (2007). 'Is Cash Flow King in Valuations?' *Financial Analysts Journal*, 63 (2): 56–68.

Loshin, J. (2007). 'Secrets Revealed: How Magicians Protect Intellectual Property Without Law'. Working Paper, Yale Law School, July, http://ssrn.com/abstract=1005564.

Low, J. and Kalafut, P. C. (2002). *Invisible Advantage: How Intangibles are Driving Business Performance*. Perseus Publishing.

Lucas, R. E. (2002). *Lectures on Economic Growth*. Cambridge, MA: Harvard University Press.

Malinowski, B. (1922). *Argonauts of the Western Pacific*. London: Routledge and Kegan Paul.

Mauss, M. (1950). *The Gift: Forms and Functions of Exchange in Archaic Societies*. London: Norton and Co. Translated by W. D. Halls, 1990.

McGuire, M. C. and Olson, M. (1996). 'The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force'. *Journal of Economic Literature*, 34 (1), March: 72–96.

Merchant, K. A. (2006). 'Measuring General Managers' Performance: Market, Accounting and Combination-of-Measures Systems'. *Accounting, Auditing and Accountability Journal*, 19 (6): 893–917.

MERITUM (2002). *Guidelines for managing and reporting on intangibles*. Cañibano, L., García-Ayuso, M., Chaminade, C. (eds.), Fundación Airtel Móvil.

Miller, H. I. and Conko, G. (2004). *The Frankenfood Myth: How Protest and Politics Threaten the Biotech Revolution*. Praeger Publishing, Westport, CT.

Mithen, S. (2004). *After The Ice: A Global Human History, 20,000–5000 B.C.*, Cambridge, MA: Harvard University Press.

Moser, P. (2004). 'Determinants of Innovation – Evidence from Nineteenth Century World Fairs'. *Journal of Economic History*, 64 (2): 548–552.

Murphy, K. M. and Topel, R. H. (2006). 'The Value of Health and Longevity'. *Journal of Political Economy*, 114 (5), October: 871–904.

Nard, C. A. and Morriss, A. P. (2006). 'Constitutionalizing Patents: From Venice to Philadelphia'. *Review of Law and Economics*, 2 (2), Article 4. http://www.bepress.com/ rle/vol2/iss2/art4.

Nelson, R. R. and Phelps, E. S. (1966). 'Investment in Humans, Technological Diffusion, and Economic Growth'. *American Economic Review*, 56 (2): 69–75.

Ng, A. (2007). 'Accidental inventions'. Available online at: http://www.associatedcontent.com/article/68470/accidental_inventions.html.

Nicita, A. and Ramello, G. B. (2007). 'Property, Liability and Market Power: The Antitrust Side of Copyright'. *Review of Law and Economics*, 3 (3), Article 7. http://www.bepress.com/rle/vol3/iss3/art7.

Nordhaus, W. D. (1997). 'Do Real-Wage and Real-Output Measures Capture Reality? The History of Lighting Suggests Not'. In T. F. Bresnahan and R. J. Gordon (eds.). *The Economics of New Goods*. Chicago, IL: University of Chicago Press: 29–66.

Nordhaus, W. D. (2004). 'Schumpeterian Profits in the American Economy: Theory and Measurement'. Cowles Foundation Discussion Paper No. 1457, April. http://ssrn.com/abstract=537242.

North, D. (2005). *Understanding the Process of Economic Change*. Princeton, NJ: Princeton University Press.

North, D. C., Wallis, J. J. and Weingast, B. R. (2006). 'A Conceptual Framework for Understanding Recorded History'. NBER Working Paper No. 12795, December. http://ssrn.com/abstract=953360.

Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.

Olson, M. (1993). 'Dictatorship, Democracy, and Development'. *American Political Science Review* 87 (September): 567–576.

Paarlberg, R. (2008). *Starved for Science: How Biotechnology is Being Kept Out of Africa*. Cambridge, MA: Harvard University Press.

Parker, A. (2003). *In The Blink of an Eye*. Perseus Publishing.

Peltzman, S. (1973). 'An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments'. *Journal of Political Economy*, 81(5): 1049–91.

Pinker, S. (2003). 'Language as an adaptation to the cognitive niche'. In M. Christiansen and S. Kirby (eds.), *Language Evolution: States of the Art*. New York: Oxford University Press.

Power, S. (2003). 'The AIDS Rebel'. *The New Yorker*, May 19: 54.

Pringle, H. (1998). 'The Slow Birth of Agriculture'. *Science*, 282 (5393): 1446–1450.

Rai, A. K. and Eisenberg, R. S. (2003). 'Bayh-Dole Reform and the Progress of Biomedicine'. *Law and Contemporary Problems*, 66 (1/2) Winter/Spring: 289–314.

Rajan, R. and Zingales, L. (2003). 'The Great Reversals: The Politics of Financial Development in the Twentieth Century'. *Journal of Financial Economics*, 69: 5–50.

Roberts, S. M. (2005). 'Diversity in Learning'. *Ideas That Matter* 3 (3), September: 39–43.

Romer, P. M. (1990). 'Endogenous Technological Growth'. *Journal of Political Economy*. 3 (3), September: 39–43.

Rosling, H. (2006). *Debunking Third-World Myths with the Best Stats You've Ever Seen*. TED2006 presentation. http://www.ted.com/talks/view/id/92.

Rosling, H. (2007). *New Insights on Poverty Around the World*. TED2007 presentation. http://www.ted.com/index.php/talks/view/id/140.

Ryan, S. and Zarowin, P. (2003). 'Why Has the Contemporaneous Linear Earnings-Return Relation Declined?'. *The Accounting Review*, 78 (2): 523–553.

Sahlins, M. (1972). *Stone Age Economics*. New York, NY: Aldine De Gruyter.

Schelling, T. C. (1995). 'What Do Economists Know?' *The American Economist* 39 (1), Spring: 20–22.

Schneider, H. and Fassin, D. (2002). 'Denial and Defiance: A Socio-Political Analysis of AIDS in South Africa'.

AIDS, 16 (Supplement): S45–S51.

Schumpeter, J. A. (1939). *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*. New York, NY: McGraw-Hill.

Schumpeter, J. A. (1942). *Capitalism, Socialism, and Democracy*. New York, NY: Harper and Row.

Schwabach, A. (2007). 'Intellectual Property Piracy: Perception and Reality in China, the United States, and Elsewhere'. TJSL Legal Studies Research Paper No. 1022243, October. http://ssrn.com/abstract=1022243.

Seabright, P. (2004). *The Company of Strangers: A Natural History of Economic Life*. Princeton, NJ: Princeton University Press.

Sidley, P. (2000). 'Malaria Epidemic Expected in Mozambique'. *British Medical Journal*, 320 (7236), 11 March: 669.

Simon, J. L. (1981). *The Ultimate Resource*. New York, NY: Princeton University Press.

Simon, J. L. (2000). *The Great Breakthrough and Its Cause*. T. Kuran (ed.), Ann Arbor, MI: University of Michigan Press.

Smith, A. (1776). *The Wealth of Nations*, Chicago, IL: University of Chicago Press (Reprinted 1976).

Solow, R. M. (1956). 'A Contribution to the Theory of Economic Growth'. *Quarterly Journal of Economics*, 70 (1), February: 65–94.

Solow, R. M. (1957). 'Technical Change and the Aggregate Production Function'. *Review of Economics and Statistics*, 39 (3), August: 312–320.

Sombart, W. (1919). *Der Moderne Kapitalismus*. Munich, Germany: Duncker and Humblot.

Spar, D. L. (2001). *Ruling The Waves: Cycles of Discovery, Chaos and Wealth, from the Compass to the Internet*. New York, NY: Harcourt, Inc.

Spergel, D. N., Verde, L., Peiris, H. V., Komatsu, E., Nolta, M. R., Bennett, C. L., Halpern, M., Hinshaw, G., Jarosik, N., Kogut, A., Limon, M., Meyer, S.S., Page, L., Tucker, G. S., Weiland, J. L., Wollack, E. and Wright, E. L. (2003). 'First-Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Determination of Cosmological Parameters'. *The Astrophysical Journal Supplement Series*, 148: 175–194.

Strathern, A. (1971). *The Rope of Moka*. Cambridge, UK: Cambridge University Press.

Stewart, T. A. (1997). *Intellectual Capital: The New Wealth of Organizations*. New York, NY: Doubleday.

Stigler, G. J. (1971). 'The Theory of Economic Regulation'. *Bell Journal of Economics*, 2 (1): 3–21.

Suttles, W. (1960). 'Affinal Ties, Subsistence, and Prestige among the Coast Salish', *American Anthropologist*, 62 (2), April: 296–305.

Sveiby, K. E. (1997). *The New Organizational Wealth: Managing & Measuring Knowledge-based Assets*. Sydney: Berret-Koehler Publishers.

Szabo, N. A. (2005). *Shelling Out – The Origins of Money: New Theories on the Origins and Nature of Money*. http://szabo.best.vwh.net/shell.html.

Tainter, J. (1988). *The Collapse of Complex Societies (New Studies in Archaeology)*. Cambridge, UK: Cambridge University Press.

Teece, D. J. (1987). 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy'. In D. J. Teece (ed.), *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*. Cambridge, MA: Ballinger Publishing Company: 185–219.

Teece, D. J., 2001, *Managing Intellectual Capital: Organizational, Strategic and Policy Dimensions (Clarendon Lectures in Management Studies)*. Oxford,

UK: Oxford University Press.

Teece, D. J. (2003). 'The Strategic Management of Technology and Intellectual Property'. In D.O. Faulkner and A. Campbell (eds.), *The Oxford Handbook of Strategy, Vol. I: A Strategy Overview and Competitive Strategy*: Oxford, UK: Oxford University Press: 132–166.

Trewavas, A. J. (2001). 'The Population/Biodiversity Paradox. Agricultural Efficiency to Save Wilderness'. *Plant Physiology*, 125 (1), January: 174–179.

Uhlig, R. (ed.) (2001). *James Dyson's History of Great Inventions*, London, UK: Constable and Robinson.

UNDP (2007). *United Nations Development Report 2007–8*, New York, NY: Palgrave Macmillan. United Nations Development Programme. http://hdr.undp.org/en/reports/global/hdr2007-2008/.

United Nations, Department of Economic and Social Affairs, Population Division, 2007, *World Population Prospects: The 2006 Revision, Highlights*, Working Paper No. ESA/P/WP.202. http://www.un.org/esa/population/publications/wpp2006/WPP2006_Highlights_rev.pdf.

Varian, H. R. (2005). 'Copying and Copyright'. *Journal of Economic Perspectives*, 19 (2), Spring: 121–138.

Warsh, D. (2006). *Knowledge and the Wealth of Nations: A Study of Economic Discovery*, Norton, New York.

Waymire, G. B. and Basu, S. (2008). 'Accounting is an Evolved Economic Institution'. Working Paper, Emory University and Temple University, April.

World Bank (2006). *Where is the Wealth of Nations?: Measuring Capital for the 21st Century*, Washington D.C.: The World Bank. http://siteresources.worldbank.org/INTEEI/214578-1110886258964/20748034/All.pdf.

WHO (2006). *WHO Gives Indoor Use of DDT a Clean Bill of Health for Controlling Malaria*, September 15, Press release. World Health Organisation. http://www.who.int/mediacentre/news/releases/2006/pr50/en/index.html.

WIPO (2007). *WIPO Patent Report: Statistics on Worldwide Patent Activity* (2007 Edition), Geneva, Switzerland: World Intellectual Property Organisation. http://www.wipo.int/ipstats/en/statistics/patents/patent_report_2007.html.

Wuchty, S., Jones, B. F. and Uzzi, B. (2007). 'The Increasing Dominance of Teams in the Production of Knowledge'. *Science*, 316, May: 1036–1039.

Accounting for intangibles – a critical review of policy recommendations

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Abstract—I review and critically evaluate the arguments in favour of reforming current accounting and disclosure practices related to intangibles. I argue that the case for reform is actually rather weak. Proponents of reform provide little cogent evidence in support of claims that current practice is having adverse capital market effects. In fact, theory and evidence from corporate finance suggest that capital markets perform well in financing investments in innovative, high-technology activities. I discuss why mandating additional disclosure in this area is unlikely to be successful and that proposals to recognise intangibles are also flawed.

Key words: intangibles; accounting reform; accounting standards

1. Introduction

Over the last 15 years or so there have been a number of calls for accounting reforms, with claims that the traditional historical cost approach has outlived its usefulness.[1] One of the claims made in these debates is that the economy has changed in fundamental ways, that business is now fundamentally 'knowledge-based' rather than industrial, and that 'intangibles' are the new drivers of economic activity. Based on these claims, commentators contend that one of the key problems faced by financial reporting is that financial statements fail to recognise many of the most important knowledge-based intangibles, such as intellectual capital, and that this has adversely affected investments in intangibles.[2] This has led to calls for accounting standard-setters to re-evaluate how intangibles are accounted for, and to make reforms.

My goal in this paper is to synthesise and evaluate the current set of policy proposals in this area. My main objective is to provide a critical review of the claims made by the various commentators in this area to justify the need for reform as well as to review the proposals themselves. I argue that the case for reform is surprisingly weak, and does not support claims that large-scale reforms are necessary. More specifically, I argue that capital markets actually function rather well in financing compa-

nies that engage in innovative, high-technology, and knowledge-based activities. In addition, I argue that an approach to intangibles that involves mandating more extensive disclosure in this area is likely to be unsuccessful, but that there are market-based incentives for companies to voluntarily provide these disclosures. Moreover, I argue that proposals to modify the current accounting model to recognise intangibles on the balance sheet are flawed for a number of reasons.

The paper proceeds as follows. Section 2 discusses the definition of intangibles and so lays out the scope of my discussion. Section 3 then presents and analyses the case for reform, which I find is rather weak. Section 4 then discusses and evaluates proposals related to improving disclosure related to intangibles, while Section 5 discusses and evaluates proposals related to recognition. Section 6 concludes.

2. What exactly do we mean by 'intangibles'?

Before evaluating the various policy proposals, it is important to clearly distinguish the different terms used by commentators in this area and arrive at a clear definition of intangibles. My review of the extant literature indicates that the majority of

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[1] For example, the Jenkins Report, a report from a committee formed by the AICPA in the United States in 1991 and chaired by Edmund Jenkins, provided a number of recommendations, such as (1) making financial reporting more forward-looking, and (2) reporting business measures outside the conventional financial reporting model, including product reject rates, market shares, measures of customer satisfaction, patents, and others. See DiPiazza et al. (2006) for a more recent call for change in the financial reporting model.

[2] For example, see Cañibano et al. (2000), Lev (2001), Meritum (2001), and Nakamura (1999).

the discussion on intangibles falls into two different areas.[3] First, the most sweeping proposals take a broad view of intangibles, and include in this category virtually any resource that is both intangible (lacking physical substance) and of economic value to the firm.[4] This includes all types of intellectual capital, including those items associated with the firm's human capital (the value of employee training, morale, loyalty, knowledge, etc.), process-related capital (the value of intangibles associated with information technology, production processes, etc.), and external relations (customer satisfaction, customer loyalty, business relationships, other components of brand values, etc.).

Second, mindful of the practical difficulties associated with such a wide-reaching definition, accounting standard-setters are currently evaluating accounting for a narrower set of items, most notably by limiting discussion to those intangibles that are 'identifiable' (i.e. items that have value on a stand-alone basis) and meet conventional definitions of assets.[5] It appears that standard-setters are most concerned, at least in the short-run, with achieving better consistency in accounting for intangibles. In particular, there are concerns about the different treatment of intangibles acquired in external transactions (which are usually recognised as assets) and those that are internally developed (which are not).

Accounting standard-setters have also devoted a great deal of attention to accounting for goodwill, which is a topic that I leave aside because it is largely separable from the discussion in many of the proposals on intangibles accounting and because its recognition and measurement is related to accounting for business combinations, which I see as taking the discussion too far afield. I would note though that a loose definition of goodwill – as the excess of a business' economic value over its book value – is taken by commentators as evidence of the failure of the current accounting model to correctly recognise intangibles, a view that I address specifically below.

In this paper, I spend most time on proposals related to the broader definition of intangibles discussed above, although most of the points that I make as part of my discussion are also relevant to the narrower questions currently of interest to standard-setters.

3. The case for reform of accounting for intangibles

This section examines the case for changing current practice with respect to accounting for intangibles. The case in favour of reform rests on various claims about how the current accounting system is deficient. In most cases, I do not find these arguments very convincing and so am skeptical about the need for reform in this area. I dis-

cuss the various arguments in turn in Section 3.1 below. In particular, proponents of reform argue that alleged deficiencies in the current accounting model inhibit the ability of companies that rely on intangibles from obtaining financing in capital markets. Section 3.2 provides a counter to this argument, and suggests that markets actually work rather well in financing all types of economic activity, including innovative knowledge-based activity.

3.1. Evaluating the case for reform

There are a number of arguments in favour of reforming current practice relating to accounting and disclosure of intangibles. I summarise these arguments in turn below, and provide an accompanying evaluation of each argument.

1) *The economy has changed in such a way that conventional financial statements have become less relevant.*

This argument starts with the observation that businesses are increasingly creating value through knowledge-based resources that lack physical substance (i.e. intangibles). Those who make this argument sometimes also assert that the traditional industrial model, in which businesses add value by applying labour and capital to transform raw material into finished products, is becoming increasingly less important.[6]

This argument is undoubtedly true to some degree. There is little doubt that technology companies such as Google, Microsoft, Samsung, Nokia, and others play a more important role in the world's economy than was true as recently as

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[3] My goal in this paper is not to provide a comprehensive review of the intangibles literature. There is a large volume of literature, especially with respect to the disclosure of information about intellectual capital, and especially in Europe, that I do not reference. Instead, my goal is to discuss and evaluate the principal policy recommendations with respect to accounting for intangibles.

[4] For example, the *Meritum Guidelines* (p. 9) defines intangibles as non-monetary sources of probable future economic benefits that lack physical substance, are controlled as a result of past transactions and events, and may or may not be separable.

[5] See the IASB Project Update 'Intangible Assets' (June 2007). GAAP typically requires that an asset possess three essential characteristics (e.g. SFAC 6, para. 26): (i) it embodies a future economic benefit (contributes directly or indirectly to future net cash flows), (ii) a particular entity can obtain the benefit and restrict others' access to it, (iii) a particular transaction or event giving rise to the benefit or control has already occurred. This statement specifically indicates that assets may be intangible and that legal enforceability of a claim to a benefit is not a prerequisite if the entity can obtain or control the benefit in other ways. Notice that it is not clear that intangibles like intellectual capital satisfy this definition if the entity cannot fully control the associated benefits.

[6] Lev (2001) advances the related argument that traditional forms of economic activity, such as manufacturing, have become increasingly commoditised.

20 years ago, and that more traditional companies are also increasingly relying on knowledge-based assets to generate value. I take issue, however, with the related implication that this growth occurs as a result of a substitution of resources away from more 'traditional' industries. The economic fortunes of most industries are to some degree cyclical; thus, while internet and telecom stocks were in vogue in the late 1990s, helping to fuel the growth of the 'New Economy', over the last several years we have seen a resurgence in more traditional industries, such as oil and gas, mining, commodities, and steel, largely due to booming demand for industrial output in emerging markets such as China. So I think the case that these traditional industries are passé is overstated.

Of more relevance to the accounting proposals, however, is the claim that the emergence of technology companies (i.e. those whose value is comprised of significant amounts of intangibles) naturally implies that that the conventional accounting model is broken. Several arguments are offered as evidence in support of this claim, all of which I believe are largely flawed.

2) Financial statements are less relevant than they were in the past.

A number of research papers investigate the claim that financial statement variables are now less relevant in the sense that financial statement numbers are less closely related to security prices. While some papers claim to find support for this statement, others claim to find the opposite, including papers that specifically examine technology companies.[7] The fact that conclusions differ across studies is due in part to the use of different methodologies, which is due in turn to the fact that there is controversy in this area about the appropriate econometric methods. In addition, some of these studies use samples that end in the early to mid-1990s, before the rise of the New Economy.

Thus it is interesting to consider a more recent study by Core et al. (2003), who specifically investigate whether there was a change in the relation between stock prices and financial variables during the 'New Economy Period', which they define as the late 1990s. They find that stock market values are both higher and more volatile during this period, that the relation between these values and financial statement variables remains stable during this period compared with preceding periods, but that the explanatory power of these financial statement variables declines during this period.[8] Thus, while there is no decline in the usefulness of traditional financial statement variables, those variables explain a lower fraction of the variation in stock values during this period. It would be interesting to extend this research to the period after 2000–2001, after what is now viewed as a 'bubble'

in the prices of high-technology companies had burst. It is possible that the decline in explanatory power Core et al. observe is due to 'irrationally exuberant' stock prices during the late 1990s.[9]

3) The existing accounting model simply fails to recognise many knowledge-based intangibles.

This argument is certainly correct – in many cases, internally developed intangibles, such as brand names, customer relationships, employee morale and training, etc., fail to satisfy asset recognition criteria under current GAAP rules, whether IFRS or US GAAP. However, although this statement is correct, it does not follow that there is a problem with the accounting model. Proponents of reforming accounting for intangibles infer directly from the fact that many economically valuable intangibles are not recognised in the balance sheet that there is a problem with the accounting. For example, some claim that the failure to recognise such intangibles means that investors will systematically undervalue companies whose value is largely dependent on knowledge and technology, and consequently that these companies will have difficulty raising capital. For example, see Lev (2001) and the *Meritum Guidelines*.

This argument does not make sense to me. As discussed further below, under current accounting conventions the balance sheet is not designed to form the basis for valuation. Rather, most approaches to equity valuation rely on information from the income statement, and use that information to forecast future revenues, earnings, and cash flows. As Penman (2007) demonstrates, this approach works well to value companies, even those for which relatively large amounts of value are attributable to intangibles.

Moreover, as far as I can tell, proponents of this view do not offer any convincing evidence to support the claim that technology companies are handicapped in their ability to raise equity capital. In fact, many technology companies (for example, Google and Cisco) are valued relatively highly by

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[7] See, for example, Brown, Lo, and Lys (1999), Chang (1998), Collins, Maydew, and Weiss (1997), Francis and Schipper (1999), and Lev and Zarowin (1999). Collins et al. (1997), and Francis and Schipper (1999) both report evidence that the overall value relevance of earnings and book values has remained stable over time, while Chang (1998), Brown et al. (1999), and Lev and Zarowin (1999) report a decline in overall value relevance.

[8] Their results are consistent across different subsamples of firms, including young technology companies.

[9] Penman (2003) argues that an important role of the traditional financial reporting model is to serve as an anchor during bubbles 'to check speculative beliefs'. Under this view we expect exactly those results that Core et al. (2003) obtain – the fact that the traditional financial statement variables do not explain equity values very well during this period indicates that those equity values were out-of-line with fundamentals, rather than suggesting some kind of deficiency in financial reporting.

investors and seem to have had little trouble rais-
ing capital. Google currently has market value in
excess of $220bn,[10] an amount that is well over 10
times its current book value (of $17bn). It is hard
to argue that Google has had difficulty raising eq-
uity capital, or that it issues shares on un-
favourable terms.

This argument is supported by academic evi-
dence. Fama and French (2004) find that the set of
firms that obtain stock market financing expanded
tremendously in the 1980s and 1990s – there was
almost a fourfold increase in the number of firms
going public on US stock exchanges between 1980
and 2001. Moreover, firms that go public are in-
creasingly less profitable, with higher growth and
lower survival rates than was the case before 1980.
This is consistent with my assertion that less prof-
itable 'growth' stocks that tend to be riskier have
been increasingly successful in accessing public
equity markets. This evidence runs counter to what
those advocating reform would have us believe.

A related version of this argument points to the
'large' and increasing difference between book
values and market values of certain companies as
evidence that there is a problem with the book value
number, in that it is 'missing' the value of intangi-
bles.[11] Under this argument, commentators are es-
sentially arguing that in an ideal world accounting
book values would be set equal to the firm's mar-
ket value. Even if we assume that the gap between
market and book values is solely due to the value
of unrecognised intangibles,[12] a close examination
of this argument reveals that it misapprehends the
role of financial statements, whether one takes a
stewardship (contracting) perspective or a valua-
tion (investor) perspective on accounting.

The basic premise of the stewardship model of
financial reporting is that financial statements pro-
vide information useful for contracting among the
various parties to the firm. It follows from this per-
spective that reliability of balance sheet measure-
ments is of paramount importance, which explains
the prominent role of external transactions as a
means of validating the existence and amount of
transactions. This approach, which is fundamental
to our current accounting model and has long-run
survival value, precludes the recognition of items
that do not result from external transactions and
events and/or for which measurement is costly to
verify. Consequently, our current model precludes
the recognition of internally developed intangibles
because the future benefits of these expenditures
are inherently uncertain and very difficult for ex-
ternal auditors to verify.[13]

Consider the use of accounting in lending agree-
ments. The asymmetric nature of lenders' claims
on firms' assets is such that they are generally only
willing to lend to the firm to the extent that it has
tangible assets because these assets typically retain

much of their value in the event of bankruptcy/liq-
uidation. Conversely, the excess of firm value over
book value often disappears once the firm ceases
to be a going concern. This occurs because this ex-
cess often represents the value of intangibles
whose value is intrinsically linked to the firm
itself, and do not have value once the firm is no
longer a going concern.[14]

Even if one rejects the stewardship perspective
on accounting and adopts instead what we might
call an investor (or valuation) perspective, under
which the primary role of accounting is to provide
information useful to investors in valuing the com-
pany, it is still not the case that we would want
book value to track the company's market value.
As Penman (2007) points out, valuation relies on
information provided by the income statement
rather than the balance sheet. He uses Coca-Cola
as an example, and points out that Coke has a mar-

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[10] November 2007.

[11] For example, see DiPiazza (2006: 16): 'The large dis-
crepancies between the 'book' and 'market' values of many, if
not most, public companies ... provide strong evidence of the
limited usefulness of statements of assets and liabilities that
are based on historical costs.' This argument became prevalent
during the late 1990s when stock prices increased dramatical-
ly, especially for technology stocks, so that the gap between
book and market values became especially large. Notice that
the argument ignores other possible explanations for increas-
ing market-to-book values; for example, certain changes in
GAAP rules (such as the recognition of pension and other
post-employment benefit obligations) may have lowered book
values.

[12] It is not. Perhaps most obviously, market values capitalise
investors' expectations about the firm's future growth oppor-
tunities while book values do not. To the extent that public eq-
uity markets now contain a larger fraction of young 'growth'
companies than was the case (say) 20 years ago (Fama and
French, 2004), we expect that market-to-book ratios will in-
crease over time. See Rowchowdhury and Watts (2007) for a
more complete discussion of market-to-book ratios.

[13] The future benefits associated with intangibles such as
R&D are typically more uncertain than those associated with
most assets currently recognised under GAAP. For evidence
on this, see Kothari et al. (2002) or Shi (2003).

[14] See Holthausen and Watts (2001) for further discussion of
this point. Consider also Alan Greenspan's testimony to
Congress in February of 2002 about the failure of Enron: 'As
the recent events surrounding Enron have highlighted, a firm
is inherently fragile if its value added emanates more from
conceptual as distinct from physical assets. A physical asset,
whether an office building or an automotive assembly plant,
has the capability of producing goods even if the reputation of
the managers of such facilities falls under a cloud. The rapid-
ity of Enron's decline is an effective illustration of the vulner-
ability of a firm whose market value largely rests on
capitalised reputation. The physical assets of such a firm com-
prise a small portion of its asset base. Trust and reputation can
vanish overnight. A factory cannot.' (Quote taken from Lev
(2002)). A front page Wall Street Journal article from April
2002 makes the interesting point that because value is now in-
creasingly derived from intangibles, companies are now much
more vulnerable to sudden declines in value, which shortens
their life spans. See 'The Rise and Fall of Intangible Assets
Leads to Shorter Company Life Spans,' The Wall Street Journal,
4 April, 2002, p. 1.

ket/book ratio in excess of six, a difference that he attributes to the fact that the value of the Coca-Cola brand name is 'missing' from the company's balance sheet. Nevertheless, he goes on to show that Coke can be valued relatively easily and accurately using conventional historical cost financial statements.[15]

Penman also points out that in a world under which accounting book values track market values, investors would lose much valuable information about both the historical costs of firm assets and the performance of management in transforming those assets into revenues. In other words, the traditional income statement provides investors with information about how well management performs selling goods and services above cost. Such information would be lost under a model in which book value tracked market value since the income statement would then record unrealised gains and losses on the firm's portfolio of assets and liabilities, so that analysts would lose much of the information on which fundamental analysis is based.

4) Misallocation of resources argument

Some commentators argue that firms with large amounts of intangibles relative to fixed, tangible assets are handicapped in their ability to obtain financing.[16] Some rely on this assertion to claim more broadly that innovation in the economy is stifled by the inability of firms that rely on knowledge-based assets to fund the research and other activities necessary for innovation to continue.[17] Once again, little evidence is offered in support of this claim and, indeed, both economic logic and casual empiricism suggest otherwise.

Perhaps the most fully exposited version of this line of reasoning is made by Lev (2001), who makes a number of arguments to support the claim that the current lack of disclosure about intangibles has adverse effects on capital markets. I do not find any of these arguments very convincing.

First, Lev argues that firms with large amounts of intangibles have a higher cost of capital, and cites research by Boone and Raman (2001) in support of this claim. These authors find that firms with relatively large amounts of R&D 'assets' (which they estimate using these firms' past R&D expenditures) have relatively higher bid-ask spreads, a common proxy for equity market liquidity. However, the authors fail to show that this result is attributable to deficiencies in these firms' disclosures or accounting, as opposed to simply reflecting the fact that these firms are economically different from firms whose value comprises mainly more tangible assets. As discussed further below, firms with relatively more 'growth options' are inherently riskier than other firms and naturally have larger information asymmetries, which leads to a less liquid market for their shares and to

a higher cost of capital (Amihud and Mendelson, 1986). In other words, these results simply reflect the fact that investors, as we would expect, believe that expenditures on intangibles are riskier than other investments. There is nothing surprising here – indeed, this is precisely why the current accounting model does not recognise these expenditures as assets.

Second, Lev argues that current accounting practice leads to the 'systematic undervaluation of intangibles' by investors. He points to two papers, both of which apparently show that shares of firms with relatively more R&D spending tend to outperform other firms in the years following that spending.[18] The implication is that these firms were previously undervalued by market participants. I also find this evidence unconvincing. To begin with, studies that cumulate measured abnormal returns after an event date are notoriously difficult to interpret given vagaries in the measurement of expected returns – in other words, it is hard to know for sure that these were in fact abnormal returns and that there was undervaluation. For example, it may be that the market correctly discounted these firms' expected cash flows because R&D projects are inherently riskier, and that the researchers' expected returns model underestimated this risk.

Moreover, even if we agree that these firms are undervalued, an important premise of this argument is that the market fails to correctly value R&D expenditures at the time they are made because those expenditures are expensed rather than capitalised at that time. Thus, it assumes that market participants naïvely respond to the accounting treatment of expenditures, and fail to understand that R&D expenditures that are not capitalised

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[15] One could argue that if it is possible to value a company without intangibles on the balance sheet, it is also possible to value a company without tangibles on the balance sheet. This observation is correct but reflects a misunderstanding about the economic role of the balance sheet. The balance sheet's primary function is in stewardship/contracting rather than in valuation. It is clear that even for entities whose value is primarily dependent on tangible assets, the balance sheet will not necessarily be very useful for valuation, for example, because of the historical cost convention.

[16] See, for example, Lev and Zarowin (1999: 383): '... the reporting inadequacies documented above may adversely affect investors' and firms' welfare ...'. Also see *Meritum Guidelines* (p. 1): '... may result in significant economic losses both for firms and their suppliers of goods, services, or capital...' or Cañibano et al. (2000: 112): 'If financial statements provide investors with biased (conservative) estimates of the firm's value (book value of equity) ... inefficiencies (myopia) may appear in the resource allocation process ...'.

[17] Wallman (1995: 89) writes that 'We cannot have financial reporting and disclosure constraints that slow the pace of progress in capital markets, decrease the rate of reduction in the cost of capital, or limit innovation...'. There is little or no evidence to support any of these claims.

[18] The papers are Chan et al. (2001) and Lev et al. (2005).

may well result in future benefits. In other words, it assumes a surprising lack of sophistication on the part of market participants, a view that I do not find plausible. As indicated above, the very fact that many technology firms trade at a large premium to their book values would seem to contradict the notion that investors mechanically rely on accounting asset recognition rules in assessing equity values.[19]

Third, Lev argues that managers of firms in R&D intensive firms make larger abnormal returns from insider trading than managers of other firms (Aboody and Lev, 2001). While this result is likely correct and would imply a higher cost of capital for these firms, this does not indicate a problem in the accounting; it is a problem related to the enforcement of the securities laws and, more fundamentally, reflects these firms' larger information asymmetries. Consequently, it is not at all clear that a different accounting or disclosure regime would change this result.[20]

In sum, there is some evidence that the market values firms whose value is principally composed of intangibles differently from other firms (although note that the evidence on this is largely limited to firms with high levels of R&D expenditures). However, this result does not necessarily say anything about the desirability of particular accounting/disclosure treatments. Instead, it simply reflects the fact that these firms have different economic characteristics from other firms (they're riskier, with larger information asymmetries) rather than any problems with their accounting or disclosure. There is no evidence that the accounting or disclosure treatment of intangibles in and of itself results in systematically lower valuations for these firms.

3.2. There is evidence that capital markets work well in providing different forms of financing to companies with different economic attributes.

It is well-known in corporate finance that the nature of firms' investment opportunities affects their financing. Myers (1977) distinguishes what he labels 'assets-in-place' (assets in which the firm has already invested) from 'growth options' (investment opportunities over which the firm has an option to proceed). He shows (and there is evidence to support this view) that information asymmetries between managers and those outside the firm are significantly larger for firms whose value largely comprises growth options. These information asymmetries make it difficult for these firms to borrow against their assets, because lenders cannot be sure that managers of these firms will not opportunistically alter their investment strategies once lending is in place.[21] Consequently, these firms typically have little debt and obtain financing principally from the equity markets. Notice that Myers' distinction between assets-in-place

and growth options corresponds quite well to the distinction between those assets conventionally recognised on the balance sheet and off-balance sheet intangibles.[22] Thus, the nature of firms' financing choices adjusts to the economic nature of their investment opportunities, including intangibles.

The point here is that markets function rather well at financing activities that generate value (more formally, that have positive NPV). Over the last 15–20 years, we have seen the rise of many prominent technology companies – Microsoft, Intel, Cisco, Dell, and now Google – whose economic value is largely attributable to some form of economic intangible that is not reflected on their balance sheets. The growth and success of these companies is testament to the fact that markets work well in providing financing to firms that create value.[23]

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[19] See Pastor and Veronesi (2003) for an economic explanation of why market-to-book ratios are relatively high for younger firms and gradually decline over time. The basic intuition is that investors learn over time about firm profitability, and that high initial market-to-book values are rational and attributable to investor uncertainty.

[20] Notice also that these managers' opportunistic insider trading is an example of agency problems between managers and shareholders. As has been well-known since Jensen and Meckling (1976), market forces are very good at addressing such problems. For example, if insider trading is costly to stockholders because it reduces market liquidity and increases the firm's cost of capital, the firm is likely to endogenously generate mechanisms that limit such behaviour.

[21] For example, once managers have obtained debt financing, they could switch to higher risk investment opportunities than those discussed with lenders, reducing the value of lenders' claims. Because lenders would rationally anticipate this opportunistic behavior, they would charge the firm an excessive interest rate on the debt. Because managers of firms whose value primarily comprises growth options cannot, at reasonable cost, credibly commit to lenders that they will not take such opportunistic actions, these firms typically avoid debt financing (although lenders could potentially address such opportunism ex ante by including debt covenants to prevent such risk shifting, the large information asymmetries inherent in these firms' businesses mean that writing and enforcing such contractual solutions is likely to be prohibitively expensive). Thus, it is not surprising that technology firms whose value largely comprises these growth options tend to have little or no long-term debt. For evidence, see Smith and Watts (1992).

[22] Other characteristics of many intangibles reinforce the idea that they are unlikely to be financed by debt. For example, many intangibles are characterised by difficult-to-enforce property rights issues – it is hard to prevent others from appropriating and enjoying the benefits associated with intangibles; employees may leave the firm, taking valuable intellectual capital with them, etc. In addition, it is less likely that secondary markets exist for many intangibles, making independent assessments of value difficult to obtain.

[23] As discussed above, large sample empirical evidence is consistent with this view (Fama and French, 2004). Notice that the nature of these firms' investment opportunities also explains their reliance on stock-based compensation, such as employee stock options, rather than cash compensation (e.g. Smith and Watts, 1992).

Indeed, the growth of the venture capital industry to finance high-tech start-ups in Silicon Valley can be explained in terms of Myers' theory. In venture capital transactions, early-stage entities – especially those in the bio-tech, telecom, and computer-related industries – have serious information asymmetry problems because of the uncertainty inherent in their investment opportunities. The rise of the venture-capital formation process – in which private investors take large equity positions in new companies – addresses these problems. For example, the large equity positions that investors take in these entities means that these investors play an active role in managing their operations and investments, mitigating information asymmetries in a way that is not possible with publicly traded equity.[24] Once these crucial early investments are in place and generating revenues, successful start-ups can then be taken public.

As another example of how markets work well to finance investments in intangibles, consider the growing market for intellectual property securitisations ('IP securitisations'). Like all securitisations, these are financing transactions under which an asset's claim to future cash flows is used to collateralise the issuance of debt securities. In this case, the asset is some type of enforceable legal right, such as patents, copyrights, or trademarks. These transactions are being used to finance a large array of intangibles, some prominent examples being:[25]

• The 1997 issuance of bonds collateralised by the future sales of David Bowie's music catalogue ('Bowie Bonds').

• A US$1.7bn financing by Dunkin' Brands backed by an array of assets that included claims to future royalties the company will receive from franchisees.

• A US$210m financing by Paramount backed by royalties from films that it had not yet made.

• A US$1.4bn financing based on the future licensing revenues from a portfolio of Formula 1 Grand Prix contracts.

Notice that these are cases for which the future benefits associated with the underlying intangible are inherently more uncertain than those associated with tangible assets such as factories and equipment, which are the types of assets more typically financed by debt.

To provide some evidence on whether spending on intangibles has been inhibited by its accounting treatment, I gathered data from Compustat on three different types of expenditures made by US publicly traded firms over the period 1980–2005. As a proxy for intangibles expenditures, I gathered data on both R&D and advertising expenditures.

To provide a benchmark for these expenditures, I also gathered data on capital expenditures (under US GAAP, capital expenditures are capitalised while most R&D and advertising expenditures are expensed as incurred). The data, after adjusting for inflation and standardising to an index of 100 in 1980, are shown in Figure 1 (overleaf).

The data in Figure 1 show a rather striking picture. Over the period since 1980, aggregate capital expenditures have grown rather modestly, by a bit less than 50% overall. In contrast, spending on intangibles has grown considerably. Aggregate R&D spending increases steadily over this period, and is 250% higher in 2005 than it was in 1980. This is striking evidence both that R&D spending is now relatively more important in the economy and that its accounting treatment has not obviously adversely affected its growth. Of course, proponents of the view that the conservative accounting treatment of R&D has hindered R&D spending could argue that this growth would have been even higher had R&D expenditures been capitalised. However, the fact that aggregate R&D spending has grown at a rate that is five times as large as capital expenditures tells us, at a minimum, that a good amount of R&D growth has occurred in spite of this alleged accounting handicap.

Advertising expenditures have also grown more strongly than capital expenditures, although the difference is not as strong as that for R&D. Advertising spending has grown by around 125% over the period from 1980 to 2005, which is nearly three times the 44% rate of growth in capital expenditures overall.

Overall, the point here is that financial markets are remarkably adept at finding ways of financing lots of different types of assets, including intangibles, and including those for which traditional means of financing (such as bank loans) are not available. It is thus hard for me to believe that companies have difficulty financing investments in intangibles, as long as those investments ultimately generate cash flow.

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[24] Gompers (1995) provides evidence consistent with this view. Specifically, he reports evidence that venture capitalists are more likely to use 'early stage' financing in high technology industries where information asymmetries are significant. He also finds that early stage firms receive significantly less money per round ('staging' is shorter) to allow more frequent monitoring and that decreases in asset 'tangibility' decrease financing duration and increase monitoring intensity. He measures asset tangibility using market-to-book ratios and R&D intensities. Kaplan and Stromberg (2003: 19) also report evidence that contracts used by venture capitalists are structured to address the agency and information asymmetry problems that are more prevalent in high-technology companies.

[25] See 'Intangible Opportunities: Securitising Intellectual Property'. The Economist, 17 June 2006.

Figure 1
Inflation-adjusted capital expenditures (Capex), advertising expenditures, and R&D expenditures for US public firms, 1980–2005
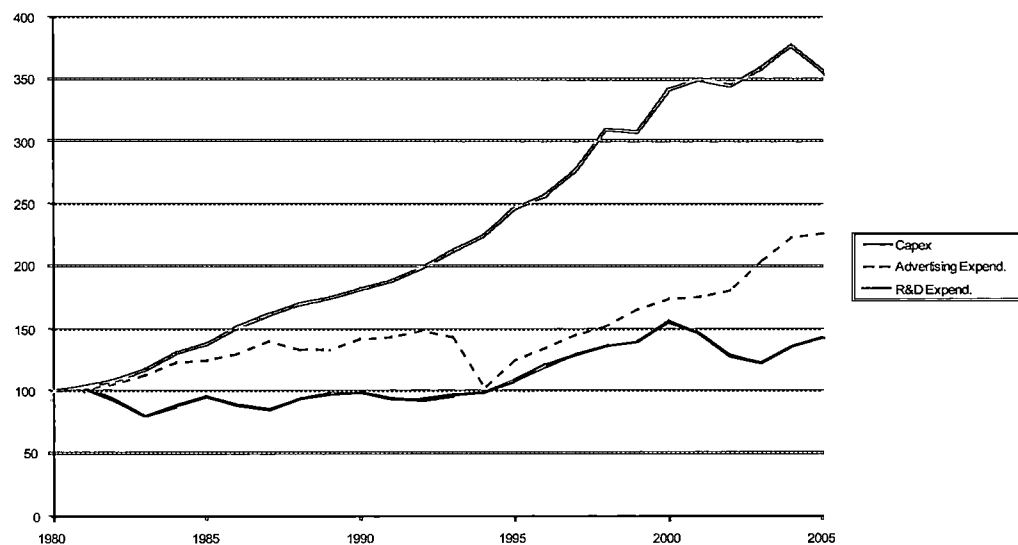
4. Current proposals for the reform of accounting for intangibles

In this section I discuss several of the principal proposals for reforming current accounting practice with respect to intangibles. Because these proposals typically take a disclosure (as opposed to a recognition) approach, I address the disclosure issue first. I address proposals related to the recognition of intangibles in Section 5.

Section 4.1 summarises a recent proposal from the CEOs of the world's six largest auditing firms; Section 4.2 summarises two representative proposals from Europe/Scandinavia; Section 4.3 summarises proposals made by Baruch Lev; Section 4.4 summarises proposals made by the Garten Report (2001). Although this list may not be exhaustive (other groups and individuals have proposed changes as well), I believe the proposals I discuss cover the full range of policy ideas. Section 4.5 provides my evaluation of these proposals, although I also make specific comments in each subsection.

4.1. Vision from the CEOs of the international audit networks

In the latter part of 2006, the CEOs of the world's six largest accounting firms released a document containing what they labelled as a vision for the world's global capital markets and economy (DiPiazza et al., 2006: 16). This document contains a number of ideas for reforms in financial reporting, including reforms related to intangibles.

Because the discussion with respect to intangibles is relatively brief, I include it here in its entirety:

[Claim] 'The large discrepancies between the 'book' and 'market' values of many, if not most, public companies ... provide strong evidence of the limited usefulness of statements of assets and liabilities that are based on historical costs. Clearly, a range of 'intangibles' that are not well measured, or not measured at all, under current accounting conventions are driving company performance. Investors and other stakeholders in business information want to know what those intangibles are, and how they might plausibly affect how businesses perform *in the future.*' (DiPiazza et al., 2006: 16).

[Proposal] 'The information produced should be forward-looking, even though it may be historical in fact. For example, the following measures are all non-financial in character but are likely to be predictive, to varying degrees, of how well a company will perform in the future: innovative success ... measures of customer satisfaction, product or service defects or awards, and measures of employee satisfaction (perhaps approximated by turnover).' (DiPiazza et al., 2006: 17).

4.2. Scandinavian proposals

A number of proposals for reporting information on intangibles have come out of projects initiated by government and academics in Europe, and specifically the Scandinavian countries. I consider

two of these proposals – those from the Meritum project (the *Meritum Guidelines*) and from the Danish Government (*Danish proposal*).[26] Both of these proposals focus on intellectual capital and develop suggested frameworks for providing information about knowledge resources. In addition, both proposals envision the resulting 'intellectual capital reports' as being used both internally for purposes of managing an organisation's intellectual property and externally for reporting to investors and other stakeholders. In neither case is there any suggested change to existing financial reporting models, i.e. both propose supplementary disclosure, and neither takes a position on whether such disclosures should be mandated.

The *Meritum Guidelines* suggest that intellectual capital has three main components – human capital (knowledge that employees take with them when they leave the firm), structural capital (knowledge that stays with the firms at the end of the working day, such as organisational routines, procedures, systems, cultures, databases, etc.), and relational capital (resources linked to the external relationships of the firm, with customers, suppliers, etc.). The Danish proposal takes a similar approach, but indicates that knowledge resources are of four major types, related to employees, customers, processes, and technologies.

These two proposals are also similar in proposing a framework that has a number of levels, each beginning with the company's overall strategic objectives. Identifying the organisation's overall strategic objectives allows it to identify its critical intangibles, which in turn allows it to identify the necessary intangible resources, which in turn allows it to identify the necessary intangibles activities. The Meritum proposal thus suggests an intellectual capital report with three components: (1) the vision of the company, (2) a summary of intangible resources and activities, and (3) a system of indicators or measures. As an example of the latter, the report suggests using 'the ratio of the number of PCs to the total number of employees' if information technology is critical to achieving the organisation's objectives.

The Danish proposal suggests a similar type of report but uses four levels: (1) a 'knowledge narrative' that discusses the products and services that the company provides, what 'makes a difference' for its customers, necessary knowledge resources,

and the relation between value and these resources; (2) management challenges related to the knowledge resources; (3) initiatives necessary to secure and manage these resources; and (4) indicators of success in developing and managing these resources.

4.3. Baruch Lev's proposals

Baruch Lev is an American accounting academic who is well-known for his views on financial reporting for intangibles, which are captured in his 2001 book (Lev, 2001). In his book, Lev (2001, Ch. 5) proposes a 'Value Chain Scorecard' based on what he calls the fundamental economic process of innovation, which starts with the discovery of new products or services, proceeds through their development and the establishment of technological feasibility, and culminates in their commercialisation. He presents (his Fig. 5.1) nine boxes, three in each of these areas:

- Discovery and learning:

  - Internal renewal (e.g. R&D, workforce training and development).

  - Acquired capabilities (e.g. technology purchase, capital expenditures).

  - Networking (e.g. R&D alliances and joint ventures, supplier and customer integration).

- Implementation:

  - IP (e.g. patents, copyrights, trademarks).

  - Technological feasibility (e.g. clinical tests, FDA approvals, beta tests).

  - Internet (e.g. alliances, online purchases, traffic).

- Commercialisation:

  - Customers (e.g. brand values, online sales, marketing alliances).

  - Performance (e.g. knowledge earnings and assets, innovation revenues).

  - Growth prospects (e.g. product pipeline and launch dates).

Lev indicates that not all of these nine categories will be applicable to all firms. He further suggests that specific indicators designed to measure these attributes be subject to three criteria: (i) quantifiable measures, (ii) standardised measures (comparability), and (iii) empirical testing to establish usefulness to users.

In many ways, this proposal is similar to those summarised above, in that he is proposing a structured approach to organising the disclosure of information about intangibles. Although he does not start with disclosures about the organisation's strategy and objectives, he nevertheless arrives at

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[26] See 'Intellectual Capital Statements – the New Guidelines' published by the Danish Ministry of Science Technology and Innovation (2003) and 'Guidelines for Managing and Reporting on Intangibles (Intellectual Capital Report)' a document produced by Meritum, a group of European researchers brought together under the auspices of the EU (report available at http://www.urjc.es/innotec/tools/MERITUM%20Guidelines.pdf) (last accessed 8 October 2007).

the same types of activity measures for reporting to investors and other users.

4.4. The Garten Report (2001)

This report was originally commissioned in October 1999 by Arthur Levitt, who was then Chairman of the SEC. The Garten Report makes two principal recommendations.

- That a new framework be created for supplemental reporting of intangible assets. The report recommends that this work be done by the SEC, but that no new reporting requirements be mandated. Rather, the report suggests that broad reporting principles for intangibles should be established, that 'Industry specific reporting practices ... should evolve naturally as companies and investors gain experience', and that the framework 'should not be a list of prescribed measures that all companies must report'.

- That regulators make the environment more conducive to innovation in disclosure practices, including consideration of safe harbour provisions to protect managers against litigation.

4.5. Evaluation of these proposals

Although all these proposals may sound reasonable in theory, I believe that there are at least several practical/implementation concerns.[27]

First, many of the measures would be industry- or firm-specific, and so not subject to standardisation or comparison (e.g. order backlogs for Boeing).

Second, from a reporting and assurance perspective, many of these measures will be difficult to verify in an objective way in part because they often differ across firms and industries and are not measured in a standardised way.

Third, proprietary costs of disclosure are likely to be significant and will lead to preparer objections.[28]

For these reasons, I believe that such proposals will be difficult to implement as mandated disclosures and so are probably better understood as guidelines for structuring voluntary disclosures. Moreover, to the extent that investors find such disclosures useful, market forces will provide managers with incentives to disclose them if those disclosures pass the cost-benefit test. For example, in certain industries the voluntary disclosure of important metrics has naturally evolved:

- Automobile manufacturers disclose sales by type of vehicle (cars, SUVs, light trucks, etc.) on a monthly basis.

- Some companies and industries disclose information on orders, order backlogs, etc., especially when they are in a business with relatively

small number of large and significant customers (Boeing, Airbus, defence contractors).

- Many life insurers outside of the US provide 'embedded value' information which many analysts find more useful than the GAAP financial statement numbers.[29]

- Advertising agencies provide detailed information on employee costs (such as headcount, revenue/headcount, often broken down by geography and line of business) and organic growth because these metrics are crucial to the valuation of these entities by external investors (for example, see disclosures by WPP Group and Publicis Groupe).

- Oil and gas producers' financial statements are arguably not very good indicators of their business activities, and so these entities typically disclose other types of information about their exploration and production activities.

Consistent with this view, researchers have found evidence that in particular industries companies disclose those metrics (outside of the financial statements) that are useful to investors and that those metrics provide information to investors. For example, see Chandra et al. (1999) regarding disclosures made in the semiconductor industry or Amir and Lev (1996) regarding the wireless communication (mobile phone) industry.

Lev largely dismisses (2001: 120) the possibility that managers will voluntarily provide information about intangibles. Lev argues that if voluntary disclosure hasn't solved the problem already, it's unlikely to happen. Notice that this view assumes that existing levels of voluntary disclosure are somehow 'suboptimal', a position that, it seems to me, is hard to support with evidence. As indicated above, we do have *some* voluntary disclosure of these types of metrics (the quantity of disclosure is not zero), so against what benchmark can we establish that this level is not sufficient? The argument rests on the types of claims discussed above in Section 2. As indicated there, there is little in the way of convincing evidence that the current system is failing us in any important ways.

An additional problem with mandating disclosure on intangibles is that it is likely to be very dif-

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[27] I am largely in agreement with the conclusions of the Garten Report, in the sense that I do not support the idea of mandating intangibles disclosure but instead favour taking regulatory action that would encourage voluntary disclosure by making it less costly.

[28] Proprietary costs are costs associated with disclosing potentially valuable information to the firm's competitors.

[29] See, for example, *European Embedded Value Principles*, CFO Forum, available at http://www.cfoforum.nl/eev_principles.pdf (last accessed 23 November 2007).

ficult to standardise these disclosures in any meaningful way.[30] For example, even if we restrict attention to one type of intangible – consider customer satisfaction – it is unlikely that there are either generally accepted measures of this variable or that measures could be standardised across different companies, industries, and economies. Customer satisfaction is likely to be very different in the automobile industry (where quality and reliability are likely to be important) than it is in the fast food industry (where service times, convenience, and pricing are likely to be most important). This means that it will be difficult for standard-setters to say anything very meaningful or specific about disclosure.

Moreover, because any disclosure standard in this area would have to be written at a high level of generality (to encompass the large amount of variation in the nature and measurement of intangibles across industries), there is likely to be a problem of whether such a rule would actually be effective in encouraging disclosure. If the rule lacks specificity, it will be relatively easy for companies to make vague, uninformative disclosures if they so choose. In an interesting recent paper, Marquardt and Wiedman (2007) find that even when the FASB issues guidance about appropriate disclosures in a relatively specific way (in this case with respect to the effect of contingently convertible securities on reported EPS), there is still a significant level of non-compliance, which leads me to believe that high-level disclosure standards on intangibles could be ineffective.[31]

Finally, it seems to me that a major shortcoming of mandating disclosures in this area is to sensibly weigh the benefits of disclosures against their costs. Even if we could reach conclusions about how to measure the benefits of disclosure (and I would argue that we cannot) it would seem very difficult for accounting rule-makers to assess the costs of those disclosures. Moreover, these costs are likely to vary considerably across different firms and industries, depending on many factors. For example, the largest category of costs is likely to be proprietary costs, which are likely to vary greatly depending on the competitive position of different firms and industries. All of these issues may explain why standard-setters' current conceptual framework largely ignores disclosure, especially when not tied to recognition.

Some proponents of enhanced intangibles disclosures make strong claims about the likely benefits of mandating disclosure. For example, Eccles et al. (2001, Ch. 10) argue that enhanced disclosure levels will likely lower firms' cost of capital, increase analyst following, and so forth. These authors often cite academic work on voluntary disclosure (e.g. Botosan, 1997) in support of their claims. However, they fail to appreciate that there

is a serious problem in drawing inferences about mandatory disclosure from these types of studies.[32] Specifically, these papers study firms' *voluntary* disclosure choices. Presumably, managers of firms that choose to make more forthcoming disclosures do so because these choices have net benefits for their firms. It does not follow that these same benefits would accrue to firms generally if these same disclosures were mandated.

To see the problem with this logic, consider the possibility that firms voluntarily make certain disclosures because the nature of their investment opportunities generates relatively large information asymmetries, which increases their cost of capital. For example, if managers of companies engaged in the development of new drugs believe they are undervalued because their financial statements do not provide external investors with sufficient information about the value of their development activities, managers of these firms could make additional voluntary disclosures. These firms would increase disclosure above the levels that are mandated until the additional (marginal) costs of disclosure equalled the associated marginal benefits. It may well be that higher disclosure for these firms results in a lower cost of capital. However, for firms without such information asymmetries,

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[30] This is very clear from Ittner's (2008) paper on the use of non-financial (intangible) measures for internal decision-making purposes. As he emphasises, empirical research on the use of non-financial measures reveals tremendous diversity across firms in terms of the measures they choose to use and the way that different measures are weighted across different organisations. This is a natural result of the fact that different businesses have different objectives and strategies. Moreover, he reports that the link between non-financial measures and outcome variables such as earnings and stock returns also varies widely and seems to depend on differences in the underlying structural relationships.

[31] This is not to say that the existence of a disclosure rule in this area would not increase the ability of auditors, audit committees, analysts, and other investors to pressure company management into improving disclosures in this area; however, my sense is that management was determined to avoid useful disclosure in this area, a mandated disclosure rule may not help very much. Consider the recent US experience after the introduction of SFAS 131, which has caused firms to improve their segment disclosures. Similar to intangibles, segment disclosure is an area where there is likely to be considerable variation across firms and industries as to the way businesses operate and so in the way segments are structured as well as claims that proprietary costs are significant. Nevertheless, the 'management approach' (which requires that firms report segment data in a manner consistent with internal reporting) adopted in SFAS 131 seems to have been successful in improving disclosure. To the extent that intangibles are important drivers of value for companies, we would expect them to have developed internal information systems to manage those intangibles. Thus, along the lines of the management approach, standard-setters could encourage or require firms to report those intangibles measures used internally for management purposes to external constituents.

[32] I am assuming that the results in these studies are not subject to questions about their reliability.

such disclosures may well be suboptimal – the fact that these firms choose not to make these additional disclosures is, to a first approximation, evidence that the marginal costs of such disclosures exceed the corresponding benefits.

In short then, it is very difficult to draw inferences from empirical work on voluntary disclosure about the likely costs and benefits of mandated disclosures. Moreover, to the extent that disclosures have net benefits, firms themselves have incentives to voluntarily provide such disclosures with regulatory intervention.

5. Why recognition of intangibles will not work

With respect to disclosure, Lev (2001) recognises the fact (see also Schipper (2007)) that the conceptual frameworks established by accounting standard-setters largely do not address disclosure issues, except in passing and rather superficially; these frameworks principally address issues related to the recognition of items in the financial statements. This means that standard-setters would have little conceptual basis for even thinking about disclosure outside of the financial statements themselves.[33]

Consequently, Lev advocates that the large accounting firms, along with accounting and securities regulators, jointly develop a disclosure framework ('Information Structure') that would standardise disclosure and so 'initiate the revelation process' (p. 122), encouraging voluntary disclosure of information about intangibles. Once this disclosure system has been established, he then advocates changing the accounting system. His principal recommendation here is to broaden the recognition criterion so that expenditures on intangibles can be recognised as assets to a greater extent. This would be accomplished by relaxing the criteria on reliability (probable future benefits) and control (that the entity has control over the asset).

More specifically, Lev advocates a successful efforts/technological feasibility approach similar to that currently used in IAS 38 or SFAS 86, but more generally applied and implemented differently, in the sense that once technological feasibility is established, the entity would go back and capitalise past as well as current/future expenditures on the project. I have a number of concerns about this approach.

First, this approach (capitalising expenditures from past periods that were initially expensed) would seem likely to compromise the consistency of the financial statement numbers – if the value chain is long, spanning several accounting periods, this approach would involve frequent revisions in previously reported numbers, potentially reducing user confidence in the reliability of the numbers.

Second, relaxed asset recognition criteria would

likely open the door further for earnings management/manipulation, a point that Lev recognises. Lev's answer is to provide sufficient (presumably footnote) disclosure so that the accounting is transparent, which then allows users to 'undo' any accounting decisions that they found questionable. This raises the question of why recognition matters so much if that recognition is to be linked to footnote disclosure. As we know all too well from the debate over accounting for employee stock options, preparers and users of financial statements place greater weight on numbers recognised in the financial statements themselves than on otherwise similar footnote disclosures, although we don't fully understand why this is the case.[34] Thus, it is not clear that footnote disclosure will fully address the concern that managers would take advantage of these types of intangibles to manipulate the numbers reported in the financial statements.

One curious feature of the argument that we should relax recognition rules to allow recognition of a greater range of intangible assets is that the prescription is asymmetric – those such as Lev who make the argument that recognition rules for assets should be relaxed do not consider the possibility that, for symmetry, we should also consider relaxing recognition rules for liabilities in a corresponding way. This may bring some unintended consequences – if we begin to recognise liabilities for which the future sacrifice of resources is more uncertain than is currently the case, it is not clear that the 'problem' of high market-to-book ratios would ultimately be solved.[35] Moreover, to the extent that expenditures on intangibles are financed in different ways to tangible assets (for example, through joint venture or other types of off-balance-sheet arrangements), relaxed recognition criteria could result in a large change in *both* sides of corporate balance sheets.

Another practical issue here is whether these relaxed recognition criteria would also apply to other (tangible) asset categories or, indeed, more generally to recognition and derecognition in financial reporting. If so, the implications for financial reporting are far-reaching.

Most types of intangibles, at least under the broad definition discussed above, tend to have dif-

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[33] Although notice that accounting standards do require qualitative disclosures in certain areas, for example, in the area of contingent liabilities – although some may argue that these disclosures are not very informative since they are often 'boilerplate' disclosures that fail to provide meaningful information.

[34] The other obvious case in point here is the treatment of capital versus operating leases. Although footnote disclosures related to operating leases are of a high quality, managers still invest economic resources to avoid balance sheet recognition (Imhoff and Thomas, 1988).

[35] Consider also that a more liberal definition of liabilities would open the door for earnings management through the use of 'hidden reserves' of earnings.

ferent economic characteristics to those assets recognised under current accounting rules.[36] These characteristics include:

a. Many intangibles are not separate, saleable, or discrete items. As such, their value is intrinsically tied to the residual value of the firm. Examples of assets in these categories are customer satisfaction, employee loyalty, certain brand names, and so on. These resources increase in value as the result of many different and interrelated activities and expenditures, making it hard to uniquely identify the costs associated with these assets.

b. The well-defined property rights associated with most tangible and financial resources currently recognised as assets often do not extend to intangibles. For example, it is often very difficult to exclude others from enjoying the benefits associated with these resources.

c. Largely because of these characteristics, there are no liquid secondary markets for many intangibles, making it difficult to reliably measure the value of these resources. This means that it will be difficult to reliably estimate fair values for these types of resources.

d. Because many intangibles are not separable and saleable, and because of poorly defined property rights, it is often difficult to write fully-specified contracts for intangibles.

These characteristics make it difficult for many intangibles to be recognised as assets under the current accounting model. Moreover, it is difficult to see how accounting rules could be modified in such a way as to allow such resources to be recognised as assets without changing the overall accounting model in important ways. The main reason relates to the non-separability issue – without being able to separately identify the costs or value attributable to each of these resources, it is not possible to reliably measure either their cost or their fair value. In addition, if the future benefits associated with these assets are both uncertain (for example, because of the property rights issues) and inherently connected to the benefits attributable to the entity as a whole, it is not clear that we could even identify individual assets to recognise. For example, future sales growth and profit margins are likely related to past expenditures on marketing, advertising, employee training and retention programs, product quality programs, and other expenditures that attract and sustain customer interest in the entity's products. It would be hard to attribute these benefits to separate assets such as customer satisfaction, employee loyalty, and so on.

6. Conclusions

Proposals for reforming accounting and disclosure practices in the intangibles area have been around for at least 15 years (dating at least to the origins of the Jenkins Committee) and accounting standard-setters have devoted considerable resources to this area. However, little actual progress has been made in terms of generating new accounting rules. I do not find this surprising. A close examination of claims made by those who advocate reform indicates that there is little evidence to support the notion that the current system has caused any serious problems for entities seeking to finance innovative, high-technology projects. In fact, I argue that financial markets work very well to finance these types of investments, although the way in which they are financed is naturally different from how tangible assets such as factories are financed. Moreover, I argue that proposals to mandate additional disclosure in the intangibles area are likely to be unsuccessful because of the fact that the nature and measurement of intangibles varies considerably across industries as well as for other reasons. I also argue that proposals to expand existing asset recognition criteria to include intangibles currently excluded from balance sheets are problematic in a number of respects. In the end, my view is that we need to rely on private incentives to encourage disclosure of information related to the management and valuation of intangibles, although regulators can help in this area by providing guidance about the forms that disclosure might take and by minimising any costs of disclosure, including legal costs.

References

Aboody, D. and Lev, B. (2001). 'Information asymmetry, R&D, and insider gains'. *Journal of Finance*, 55: 747–766.

Amihud, Y. and Mendelson, H. (1986). 'Asset pricing and the bid-ask spread'. *Journal of Financial Economics*, 17: 223–249.

Amir, E. and Lev, B. (1996). 'Value-relevance of non-financial information: The wireless telecommunications industry'. *Journal of Accounting and Economics*, 22: 3–30.

Boone, J.P. and Raman, K.K. (2001). 'Off-balance sheet R&D assets and market liquidity'. *Journal of Accounting and Public Policy*, 20: 97–128.

Botosan, C.A. (1997). 'Disclosure level and the cost of equity capital'. *The Accounting Review*, 72: 323–349.

Brown, S., Lo, K. and Lys, T. (1999). 'Use of R2 in accounting research: Measuring changes in value relevance over the last four decades'. *Journal of Accounting and Economics*, 28: 83–115.

Cañibano, L., Garcia-Ayuso, M. and Sanchez, P. (2000). 'Accounting for intangibles: A literature review'. *Journal of Accounting Literature*, 19: 102–130.

Chan, L.K.C., Lakonishok, J. and Sougiannis, T. (2001). 'The stock market valuation of R&D expenditures'. *Journal of Finance*, 56: 2431–2456.

Chandra, U., Procassini, A. and Waymire, G. (1999). 'The use of trade association disclosures by investors and

---

[36] This discussion draws upon Holthausen and Watts (2001), Lev (2001, Ch. 2), and Maines et al. (2003).

analysts: Evidence from the semiconductor industry'. *Contemporary Accounting Research*, 16: 643–670.

Chang, J. (1998). 'The decline in value relevance of earnings and book values'. Working paper, Harvard University.

Collins, D., Maydew, E. and Weiss, I. (1997). 'Changes in the value-relevance of earnings and book values over the past forty years'. *Journal of Accounting and Economics*, 24: 39–67.

Core, J.E., Guay, W. R. and van Buskirk, A. (2003). 'Market valuations in the new economy: an investigation of what has changed'. *Journal of Accounting and Economics*, (January): 43–67.

DiPiazza, S.A., McDonnell, D., Parrett, W.G., Rake, M.D., Samyn, F. and Turley, J.S. (2006). 'Global capital markets and the global economy: A vision from the CEOs of the international audit networks'. (Available http://www.deloitte.com/dtt/cda/doc/content/dtt_CEOVis ion110806(2).pdf) (last accessed 20 March 2008).

Eccles, R.G., Herz, R.H., Keegan, E.M. and Phillips, D.M.H. (2001). *The Value Reporting Revolution*. New York, NY: John Wiley & Sons.

Fama, E.F. and French, K.R. (2004). 'New lists: fundamentals and survival rates'. *Journal of Financial Economics*, 73: 229–269.

Francis, J. and Schipper, K. (1999). 'Have financial statements lost their relevance?' *Journal of Accounting Research*, 37: 319–52.

Garten, J.E. (2001). *Strengthening Financial Markets: Do Investors Have the Information They Need?* Report of an SEC-Inspired Task Force.

Gompers, P. (1995). 'Optimal investment, monitoring, and the staging of venture capital'. *Journal of Finance*, 50: 1461–1489.

Holthausen, R.W. and Watts, R.L. (2001). 'The relevance of the value-relevance literature for financial accounting standard setting'. *Journal of Accounting and Economics*, 31: 3–75.

Imhoff, E.A. and Thomas, J.K. (1988). 'Economic consequences of accounting standards: the lease disclosure rule change'. *Journal of Accounting and Economics*, 10: 277–310.

Ittner, C.D. (2008). 'Does measuring intangibles for management purposes improve performance? A review of the evidence'. *Accounting and Business Research* 38 (3): 261–272. This issue.

Jensen, M.C. and Meckling, W.H. (1976). 'Theory of the firm: Managerial behavior, agency costs and ownership structure'. *Journal of Financial Economics*, 3: 305–360.

Kaplan, S.N. and Stromberg, P. (2003). 'Financial contracting theory meets the real world: An empirical analysis of venture capital contracts'. *Review of Economic Studies*, 70: 281–315.

Kothari, S.P., Laguerre, T. and Leone, A. (2002). 'Capitalization vs. expensing: Evidence on the uncertainty of future earnings from capital expenditures vs. R&D outlays'. *Review of Accounting Studies*, 7: 355–382.

Lev, B. (2001). *Intangibles: Management, Measurement,*

and Reporting. Washington, D.C.: Brookings Institution Press.

Lev, B. (2002). 'Where have all of Enron's intangibles gone?' *Journal of Accounting and Public Policy*, 21: 131–135.

Lev, B., Sarath, B. and Sougiannis, T. (2005). 'R&D reporting biases and their consequences'. *Contemporary Accounting Research*, 22: 977–1026.

Lev, B. and Zarowin, P. (1999). 'The boundaries of financial reporting and how to extend them'. *Journal of Accounting Research*, 37: 353–385.

Maines, L.A., Bartov, E., Fairfield, P.M., Hirst, D.E., Iannaconi, T.E., Mallett, R., Schrand, C.M., Skinner, D.J. (principal author) and Vincent, L. (2003).' Implications of accounting research for the FASB's initiatives on disclosure of information about intangible assets'. *Accounting Horizons*, 17: 175–185.

Marquardt, C. and Wiedman, C. (2007). 'Disclosure, incentives, and contingently convertible securities'. *Accounting Horizons*, 21: 281–294.

Meritum (2001). *Guidelines for Managing and Reporting on Intangibles (Intellectual Capital Report)*. Document produced by Meritum, a group of European researchers brought together under the auspices of the EU (report available at http://www.urjc.es/innotec/tools/ MERITUM%20Guidelines.pdf) (last accessed 8 October, 2007).

Myers, S. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics*, 5: 147–173.

Nakamura, N. (1999). 'Intangibles: what put the new in the New Economy?' *Business Review*, (July/August): 3–16.

Pastor, L. and Veronesi, P. (2003). 'Stock valuation and learning about profitability'. *Journal of Finance*, 58: 1749–1789.

Penman, S.H., (2003). 'The quality of financial statements: Perspectives from the recent stock market bubble'. *Accounting Horizons* 17: 77–96.

Penman, S.H. (2007). 'Financial reporting quality: is fair value a plus or a minus?' *Accounting and Business Research (Special Issue: International Accounting Policy Forum)*: 33–44.

Rowchowdhury, S. and Watts, R.L. (2007). 'Asymmetric timeliness of earnings, market-to-book and conservatism in financial reporting'. *Journal of Accounting and Economics* 44: 2–31.

Schipper, K. (2007). 'Required disclosures in financial reports'. *The Accounting Review*, 82: 301–326.

Shi, C. (2003). 'On the trade-off between the future benefits and riskiness of R&D: a bondholders' perspective'. *Journal of Accounting and Economics*, 35: 227–254.

Smith, C. W. and Watts, R.L. (1992). 'The investment opportunity set and corporate financing, dividend, and compensation policies'. *Journal of Financial Economics*, 32: 263–292.

Wallman, S.M.H. (1995). 'The future of accounting and disclosure in an evolving world: The need for dramatic change'. *Accounting Horizons*, 9: 81–91.

Discussion of 'Accounting for intangibles – a critical review of policy recommendations'

Peter Elwin*

It is traditional for equity analysts to criticise academics for living in ivory towers and having no concept of the hard reality that financial markets represent. However, I could not find very much to disagree with in Doug Skinner's paper. From an analyst's point of view, the question we really want to ask is: how meaningful is book value? It is easy to assert that book value has little meaning. If you compare a company's market capitalisation to its book value, and they don't match, that might suggest that one or other figure is wrong. If you think the price is broadly correct, then the book value must be wrong; the accounts must be missing something.

If you are worried about book value being fairly meaningless, then your return on any of those balance sheet numbers is also likely to be significantly devalued. Should we do something to try to improve our return-on-assets calculations?

Perhaps a better question to ask in the context of what Doug has been saying is, 'Is the current accounting model broken?' And, perhaps more importantly, 'Would fixing it make the capital markets more efficient?'

Figure 1 summarises what analysts are striving to do with financial information.

In the main, analysts concentrate on the profit and loss account not the balance sheet. However there are obviously some sectors where the balance sheet is much more important – real-estate, banks and insurance analysts all spend a significant amount of their time looking at the published balance sheets for the companies they cover, but they still look at the profit and loss (P&L) account as well. However, outside those sectors analysts do not start with the balance sheet. The balance sheet is not the answer and, frankly, never will be. It is all about income, as Sudipta's paper alluded to. It is about assessing the productivity of the business.

Current and proposed financial reporting rules require companies to book P&L items that analysts believe do not have direct economic significance in relation to share prices. Given this presumption,

analysts will try to identify these items and exclude them from their 'adjusted earnings' numbers and companies respond to this by producing 'proforma earnings' figures using similar adjustments.

Clearly, that gives us a problem because we could have earnings before bad stuff, which a lot of companies like to put out – Enron being the classic example. At the other end of the spectrum we could have a potential total comprehensive income smorgasbord from which we can pick out the nice bits using Extensible Business Reporting Language (XBRL). We do not really want either of those; we actually want something that is quite hard to achieve but lies somewhere in the middle, underlying operating earnings.

A good example that shows you how far removed the focus of analysts is from the balance sheet and what accounting standards are often striving to do, is IFRS 3 and the US equivalent, and the amortisation and impairment charges relating to acquisition intangibles and goodwill that result. Do those deductions actually have any economic significance? Does it actually have any impact?

IFRS 3 requires companies to work very hard to identify acquisition intangibles and their useful lives. They have to employ specialists, at significant cost, and those specialists were not there a few years ago. This is a whole new market that has been created by accounting standard-setters, which is good news if you are one of those specialists, and good news if you are one of the auditors employed to check the methodology: they are not going to shout 'foul'. But, after all that hard work, analysts basically ignore those numbers. People find this very hard to believe but analysts and investors do not take account of the value of a customer list, partly because they know the value is very subjective and partly because it could disappear tomorrow. Likewise they ignore the amortisation of such intangibles because it tends to double count marketing costs that are already being expensed in the P&L.

I was very interested in Doug's analogy about credit analysts. Again, if you talk to credit analysts they are even more hard-nosed about this than any-

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Figure 1
Background – analysts focus on the P&L, not the B/S
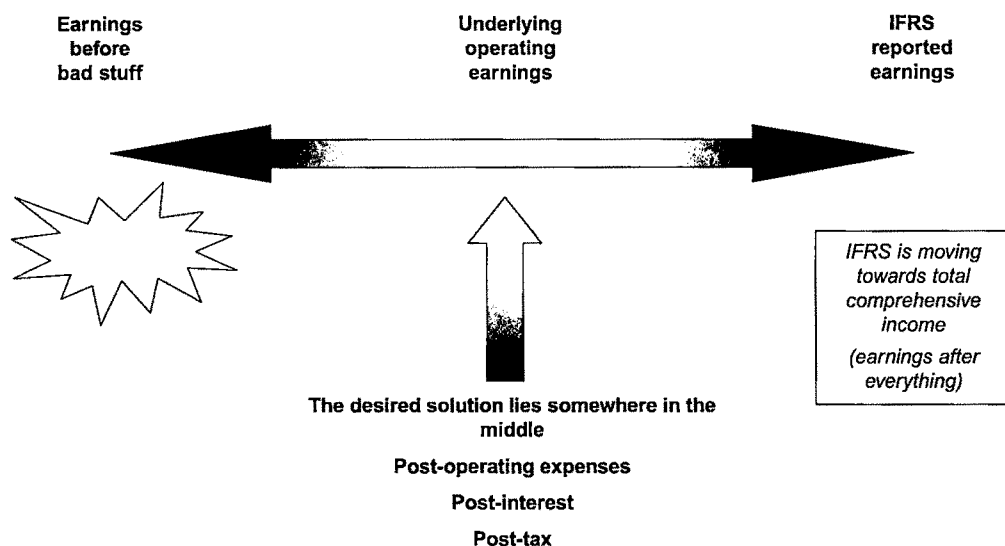
body else. 'Can I take it from the managers and flog it to somebody else? If I can, then it has value; if I cannot, then I start to worry.'

Equity analysts are more interested in business performance. We are not planning to take things away from managers because we are investing in them – so it is a slightly broader, more flexible approach. Fundamentally, analysts are ignoring goodwill impairments and they are ignoring acquired intangible amortisation. They are excluding those figures when they are looking at analysis of historic earnings and P&L data, and they are not trying to forecast those going forward.

They will look at things like patents, R&D, etc., i.e. intangibles where there is a reasonably clear intellectual legal framework, and a clearly defined legal life, and where they can be transferred to somebody else – licences and so on. Of course we will look at those. But the more touchy-feely things – can't trust them!

Does that mean the accounting model is broken? I think the better question, and this is an important twist to that question, is: would the cost of capital be lower if we did something about this perceived problem?

I would agree entirely with what Doug has been saying. Analysts do not want the balance sheet to tell them the market cap, because it will be nine months out of date. I can get Reuters or Bloomberg or my market-maker down the road to give me an estimate of market capitalisation now, not just then but now, and he will trade on it. So I do not need some sort of auditor/accounting standards process to tell me what the company was worth nine months ago; that is completely useless information and tells me nothing about the future. I do not want a balance sheet to give me a current value either at a particular moment in time, or even if it could be done on a real-time XBRL. 'Let us look at the general ledger; what is it worth now?' I do not want that. I trust the market to give me that information. The market gets it wrong sometimes, but that is okay.

Doug Skinner's paper says that the case for reform is surprisingly weak and does not support claims that large-scale reforms are necessary; and in particular capital markets actually function rather well in financing companies that are engaging in innovative, high-technology, knowledge-based activities. We need to rely on private incentives to encourage disclosure. That does not mean that private incentives are working as well as they should, and it certainly does not mean that all the companies are squeaky clean and tell you everything that they should, because clearly they do not; so there are some inefficiencies there. But I do not believe the solution would be to rearrange the whole accounting framework and start trying to bring more and more intangibles on to the balance sheet. In fact I am quite convinced that that is not the solution that the market wants.

Another important point to mention is the fact that the Corporate Reporting Users' Forum, an international group of sell and buy side analysts that I am a member of, wrote recently to the IASB saying: 'We know you are thinking about looking at

intangibles more. Well, don't; just don't do it.' We actually said: 'We think it would be really positive if you came out with a statement that said: "We have thought about looking at it and we decided not to; we decided to spend our limited resources on something more productive."'

And I think that is one of the key things. There are lots of exciting debates we could have about intangibles, and I am sure some of you can get research budgets to do that for years and years and years – and good on you! But frankly, that is not what really matters in terms of capital market efficiency. There are some other situations that are much more broken that are causing real mispricings.

Pensions would be one of my obvious examples, because that is something I have spent the last 18 months immersed in. You have only to look at the fact that Boots could disclose a £20m surplus, and then KKR could provide £1bn of funding against the pension, to realise that there is a bit of a difference – £20m surplus or £1bn funding. There is something wrong there!

That is a much more fundamental issue, which has nothing to do with intangibles.

I agree that we do not want to change things. I do not think that intangible accounting is sufficiently broken to warrant fixing.

A rejoinder to Douglas Skinner's 'Accounting for intangibles – a critical review of policy recommendations'

Baruch Lev*

1. Introduction

In a thoughtful critique of various proposals to change the current financial reporting of intangibles and their consequences, Douglas Skinner concludes '... the case for reform is surprisingly weak, ... capital markets actually function rather well, ... an approach to intangibles that involves mandating more extensive disclosure in this area is likely to be unsuccessful, ... there are market-based incentives for companies to voluntarily provide this disclosure, ... proposals to modify the current accounting model ... are flawed ...'. The following brief comments make it clear why I take exception to these conclusions, and yet I commend Skinner for urging researchers and policymakers to base their recommendations on solid research.

2. Market incentives: déjà vu all over again

A major theme of Skinner's rejection of the various proposals for change is that '... we need to rely on private incentives to encourage disclosure of information related to the management and valuation of intangibles...'. Similarly, 'Moreover, to the extent that investors find such disclosures useful, market forces will provide managers with incentives to disclose them ...', and '... to the extent that disclosures have net benefits firms themselves have incentives to voluntarily provide such disclosures ...', indicate the drift of the argument.

Such an unequivocal faith in market forces to elicit information is for me a case of déjà vu. In an influential paper at the time, the leading finance scholar Steve Ross (1979: 193) invoked the very same argument to reject the need for any disclosure regulation:

> '... the new structure [incentive-signaling model] basically supports the view that there are

strong market forces tending to lead to *adequate disclosure in absence of disclosure legislation*, a view in sharp contrast to the traditional view that disclosure regulation is required because insiders have strong incentives to withhold information (emphasis mine).'[1]

Skinner thus applies Ross' argument to the intangibles area. My question is: Why stop with intangibles? If market incentives for corporate disclosure are so effective, why require firms to disclose a cash flow statement, segment reporting, or fair values? Obviously, invoking market incentives to flatly reject disclosure proposals, without a careful consideration of market imperfections and managers' incentives, is a slippery slope.

3. Harms of current GAAP concerning intangibles

Skinner summarises his criticism of the various empirical studies suggesting that the current accounting for intangibles is harmful by: 'There is no evidence that the accounting or disclosure treatment of intangibles in and of itself results in systematically lower valuations for these firms.' This sweeping conclusion is not supported by Skinner's arguments. For brevity, I will comment on two research findings which Skinner criticises.

Boone and Raman (2001) document that research and development (R&D)-intensive firms have relatively high bid-ask spreads, and low depth, which in turn lead to excessive cost of capital. Skinner's criticism: '... these results simply reflect the fact that investors, as we would expect, believe that expenditures on intangibles are riskier than other investments.' Reading this, one would think that Boone and Raman did not control for risk in examining the relation between R&D and stocks' bid-ask spread and depth. Not so. They indeed do control for multiple risk factors, such as

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[1] At paper end, Ross adds a caveat to this sweeping conclusion.

return volatility, size, earnings volatility, beta, etc. Consequently more than just invoking a risk argument is required to reject Boone and Raman's findings.

Skinner then rejects several studies documenting *undervaluation* (and by implication – excessive cost of capital) of R&D-intensive firms, but ignores the most comprehensive and convincing study – Eberhart et al. (2004). These researchers document, based on comprehensive research using state-of-the-art risk-adjustment and long-term return cumulation methodologies, that firms which increased their R&D expenditures exhibit long-term abnormal positive returns, which leads the researchers, after rejecting various alternative explanations, to conclude: 'Our results provide strong evidence that investors systematically underreact to the benefit of an R&D increase.'

Skinner's reaction to the R&D undervaluation studies is: '... studies that cumulate measured abnormal returns after an event date are notoriously difficult to interpret given vagaries in the measurement of expected returns ...'. I find this criticism, which can be levelled at practically any market-based accounting or finance research, overly sweeping and lacking in specificity. Eberhart et al. (2004), as well as Lev et al. (2007), use state-of-the-art risk adjustment research methodologies, and to just state that '... R&D projects are inherently riskier ...' dismisses too easily important findings about harms (systematic undervaluations) apparently caused by current accounting.

Ironically, Skinner finds fault with the evidence which '... is largely limited to firms with high levels of R&D expenditures'. But note that the lack of evidence on brands, information technology, and other major intangibles is due to the very thing he rejects – proposals to expand the disclosure about intangibles.

4. A different view of R&D and advertising growth

Skinner's Figure 1 – R&D and advertising growth – leads him to conclude that 'Aggregate R&D spending increases steadily over this period, and is 250% higher in 2005 than it was in 1980. This is striking evidence ... that its accounting treatment has not obviously adversely affected its growth'.

Skinner's Figure 1 portrays aggregate expenditures of Compustat firms on capital expenditures, R&D, and advertising during 1980–2005, adjusted for inflation. But US inflation during most of that period was subdued and fell (fortunately) far short of business growth. I, therefore, believe that to ascertain whether business investment in R&D and advertising was adequate, it is more appropriate to consider R&D and advertising growth relative to *business growth*. This is, of course, the basis for the widely-used, by both researchers and practi-

tioners, measures of R&D and advertising *intensities* – the variables scaled by sales.

In Figure 1, I present, for Compustat firms, R&D and advertising intensities (scaled by sales) during the 20-year period 1987–2006. I use the ratio of total R&D to total sales.

Evidently, the 'striking' growth all but disappears. R&D intensity increased over the entire 20-year period by 17.5% (less than 1% per year), and advertising intensity decreased by 22.5%. Relative to the scale of operations, US companies have not substantially increased investment in R&D and advertising. And this, during a period when intangibles became the prime value-drivers of businesses, and as US firms are increasingly challenged by high R&D-spending China. Whether this is related to accounting for intangibles or not is, of course, hard to prove.

5. What's to be done?

Let me turn from criticising the critic to what, in my opinion, should be done to improve the reporting of intangibles. Two things: capitalisation of certain investments in intangibles, and facilitation of improved standardised disclosures about intangibles.

The CEOs of the major accounting firms recently called for changing the accounting for intangibles, in part because, 'The large discrepancies between the 'book' and 'market' values ... provide strong evidence of the limited usefulness of statements of assets and liabilities ...' (DiPiazza, et al., 2006). Skinner rejects such an argument for change based on book-market discrepancy because, '... the balance sheet is not designed to form the basis for valuation. Rather, most approaches to equity valuation rely on information from the income statement, ...'.

This rejection of the balance sheet's relevance will come to the Financial Accounting Standards Board (FASB), among others, as a great surprise. The FASB clearly prefers the balance sheet approach over the income statement in standard setting (see FASB Concepts Statements on the preference of the asset/liability approach over the matching approach).

More importantly, I frankly never understood the separate balance sheet vs. income statement arguments. Is it not the case that things affecting the balance sheet also have an impact on the income statement? Is it not the case that the expensing of R&D understates the asset values and the earnings of R&D-growth companies? Accordingly. I support the CEOs of the major accounting firms, concerned that when firms' book values are, on average, a quarter or less than market values, something is basically wrong with financial reports. Is capitalising intangibles with reasonable reliable benefits the solution?

Figure 1
R&D and advertising intensities, 1987–2006

Source: Compustat   ——— RD / Sales   ——— Advertising / Sales
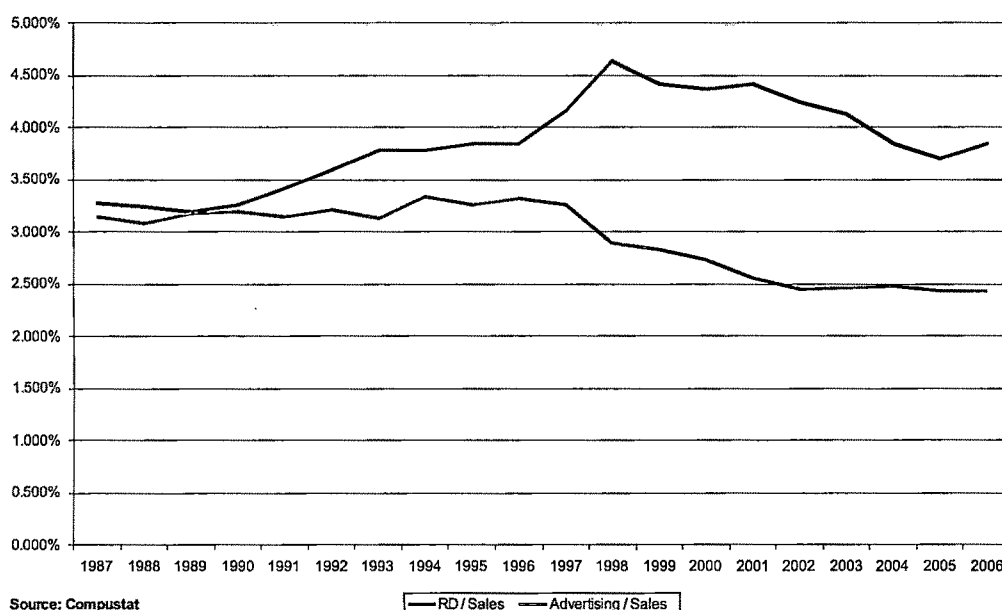
Well, the limited evidence we have provides an affirmative answer. Limited evidence, because except for software capitalisation and that of acquired intangibles, US firms do not capitalise intangibles. So, there are no data to test. But the evidence on capitalised software development costs (Aboody and Lev, 1998) clearly indicates: (1) the capitalised software is considered an asset by investors, and (2) earnings based on software capitalisation better predict future earnings than full-expensing earnings.[2] Furthermore, Oswald and Zarowin (2007), examining UK companies which capitalise R&D, document that R&D capitalisation leads to a higher association between current stock returns and future earnings (namely, investors are better informed by R&D capitalisation), and Kimbrough (2007a), studying R&D capitalisation by target companies, concludes (p. 1195):

'The evidence is consistent with the notion that both financial statement recognition and analysts' private information search activities lead to the revelation of private information about the value of R&D assets that investors incorporate into equity values.'

Regarding the capitalisation of acquired intangibles, Kimbrough (2007b) documents that investors find the values of recognised intangibles informative.
Admittedly somewhat limited, the evidence,

only some of it quoted above, nevertheless indicates that capitalising intangibles with reasonably reliable benefits (e.g. R&D, particularly of multi-projects, brand enhancement, or information technology) will be beneficial to financial statement users. I am not familiar with evidence to the contrary. An important point: R&D capitalisation doesn't mean a simple aggregation of past expenditures, as many believe. Rather, as in software development costs (SFAS 86), capitalisation commences when the project passes successfully a technological feasibility test. Capitalisation thus conveys important inside information – success of the development programme – to investors.

The second improvement in financial reporting I envisage is a standardised disclosure template about investments in intangibles (currently, only R&D expenditures are separately reported) and their consequences. Considerable evidence indicates that disclosure about intangibles, not necessarily their value, is highly relevant to investors. For example, the extent of information about product development stage at IPOs of biotech companies is negatively associated with stock volatility and bid-ask spreads (Guo et al., 2004); intensity of royalty income from licensing patents is positively associated with the market valuation of R&D expenditures (Gu and Lev, 2004); disclosure of

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[2] These findings were corroborated and extended by Mohd (2005).

innovative activities by high tech firms is value-relevant to investors (Gu and Li, 2003; Gu and Li, 2007); investors react to the granting of patents (Austin, 1993), and the quality of the scientific workforce is positively related to market values (Darby et al., 1999). This is only a partial list of evidence.

This evidence clearly indicates that information about investments in intangibles and their consequences (patents granted and licensed, product development stage, etc.) is highly relevant to investors. However, such information is haphazardly disclosed, not unlike segment information before its standardised disclosure was mandated. It would, therefore, be highly beneficial if an authoritative body, such as the FASB or the Securities and Exchange Commission (SEC), will develop templates for disclosure about intangibles, leading to the dissemination of standardised and comparable information about these all-important assets. I provide such a general template in Lev (2001), and the SEC Commission (Garten, 2001), strongly endorsed this idea.

Skinner, however, claims that such proposals will not work because: 'First, many of the measures would be industry or firm specific, and so not subject to standardisation or comparison. Second, ... many of these measures will be difficult to verify in an objective way ...'. Not so. True, some the disclosures will be applicable to broad industry groups (R&D and patents to all high tech and science-based sectors, for example) – though definitely not firm-specific – but note that much of current GAAP is industry-specific: insurance and securities companies accounting; regulated enterprises; movies, music and cable accounting; for example. Such information is obviously standardised within broad industry groups. Moreover, there is nothing new in my proposal for establishing *disclosure norms* about intangibles. SFAS 161 (derivatives), for example, is in part, a codification of measurements and risk assessments practised by some firms, and turned by SFAS 161 to a standardised disclosure.

As to Skinner's issue with the objective verification of the proposed data, many of the proposed measures, such as investment in employee training or information technology, product development stage, or percentage of sales from recently introduced products (an important innovation indicator) are *factual*, and easily subject to auditor verification.

6. Postscript

Toward the end of his paper Skinner writes '... it is difficult to see how accounting rules could be modified ... without changing the overall accounting model in important ways.' So what, if the accounting model has to be changed? Isn't the

accounting system that just over the last ten years failed to give an inkling about the late 1990s huge bubble in tech stocks, failed to alert investors to the massive accounting scandals of the early 2000s, and fails again now to reflect appropriately the vanishing values of sub-prime mortgages, due for a major overhaul? After all, isn't the declared purpose of accounting information to '... provide information to help present and potential investors and creditors and others in assessing the amounts, timing, and uncertainty of prospective cash receipts...' (FASB, Concept No. 1, p. 686)? Why can the system of national accountants be substantially overhauled with respect to intangibles – capitalising software expenditures for several years now and currently considering the capitalisation of R&D and other intangibles – but the corporate accounting system cannot change?

References

Aboody, D. and Lev, B. (1998). 'The value-relevance of intangibles: The case of software capitalization'. *Journal of Accounting Research* (supplement): 161–191.

Austin, D. (1983). 'An event-study approach to measuring innovative output: The case of biotechnology'. *American Economic Review*, 83: 253–258.

Boone, J.P. and Raman, K.K. (2001). 'Off-balance sheet R&D assets and market liquidity'. *Journal of Accounting and Public Policy*, 20: 97–128.

Darby, M., Liu, Q. and Zucker, L. (1999). 'Stakes and stars: The effect of intellectual human capital on the level and variability of high-tech firms' market values'. *National Bureau of Economic Research*, Working paper 7201, Cambridge, MA.

DiPiazza, S.A., McDonnell, D., Parrett, W.G., Rake, M.D., Samyn, F. and Turley, J.S. (2006). 'Global capital markets and the global economy: A vision from the CEOs of the international audit networks'. (Available http://www.deloitte.com/dtt/cda/doc/content/dtt_CEOVision110806 (2).pdf last accessed 20 March 2008).

Eberhart, A., Maxwell, W. and Siddique, A. (2004). 'An examination of long-term abnormal stock returns and operating performance following R&D increases'. *Journal of Finance*, 54: 623–650.

FASB (1978). Statement of Financial Accounting Concepts No. 1, *Objectives of Financial Reporting by Business Enterprises*. Financial Accounting Standards Board, US.

FASB (1985). Statement of Financial Accounting Standards No. 86, *Accounting for the Costs of Computer Software to be Sold, Leased or Otherwise Marketed*. Financial Accounting Standards Board, US.

FASB (2008). Statement No. 161, *Disclosures About Derivatives Instruments and Hedging Activities* – An Amendment of FASB Statement No. 133. Financial Accounting Standards Board, US.

Garten, J.E. (2001). *Strengthening Financial Markets: Do Investors Have the Information They Need?* Report of an SEC-Inspired Task Force.

Gu, F. and Lev, B. (2004). 'The information content of royalty income'. *Accounting Horizons*, March: 1–12.

Gu, F. and Li, J.Q. (2003). 'Disclosure of innovation activities by high-technology companies'. *Asia-Pacific Journal of Accounting and Economics*, 10: 143–172.

Gu, F. and Li, J.Q. (2007). 'The credibility of voluntary

disclosure and insider stock transactions'. *Journal of Accounting Research*, 451: 771–810.

Guo, R., Lev, B. and Zhou, N. (2004).' Competitive costs of disclosures by biotech IPOs'. *Journal of Accounting Research* (supplement): 319–355.

Jones, D. (2007). 'Voluntary disclosure in R&D intensive industries'. *Contemporary Accounting Research*, 24: 489–522.

Kimbrough, M. (2007a). 'The influence of financial statement recognition and analyst coverage on the market's valuation of R&D capital'. *The Accounting Review*, 82: 1195–1225.

Kimbrough, M. (2007b). 'Do investors rely on purchase price allocation disclosure?'. Working paper, Harvard University.

Lev, B. (2001). *Intangibles: management, measurement, and reporting*. Washington, D.C.: Brookings Institution Press.

Lev, B., Nissim, D. and Thomas, J. (2007). 'On the informational usefulness of R&D capitalization and amortization', in *Visualizing Intangibles: Measuring and Reporting in the Knowledge Economy*. S. Zambon and G. Marzo, eds., Ashgate Publishing Co.: 97–128.

Mohd, E. (2005). 'Accounting for software development costs and information asymmetry'. *The Accounting Review*, 80: 1211–1231.

Oswald, D. and Zarowin, P. (2007). 'Capitalization of R&D and the informativeness of stock prices'. *European Accounting Review*, 16: 703–726.

Ross, S. (1979). 'Disclosure regulation in financial markets: Implications of modern finance theory and signalling theory', in Edwards, ed., *Issues in Financial Regulation*, McGraw Hill: 177–202.

A reply to Lev's rejoinder to 'Accounting for intangibles – a critical review of policy recommendations'

Douglas J. Skinner*

1. Introduction

Baruch Lev has written a thoughtful response to my commentary on policy recommendations for intangibles. I am glad that my paper has generated a response from Professor Lev, who is acknowledged as perhaps the leading expert on this topic, because I think the way we make progress on questions such as this is to engage in dialogue. Lev's response does not change my views – I still believe that the case in favour of intangibles reform is underwhelming. Rather than reiterating points I have previously made, let me respond to some of Professor Lev's specific comments and simply encourage the reader to read both pieces carefully and reach their own conclusions.

2. The role of market incentives

Lev points out that one of the themes in my commentary is a reliance on markets to solve financial reporting problems. My response to this is that, to paraphrase an old song, 'if believing in markets is wrong, I don't want to be right.' I am not repentant; I do believe that markets work well most of the time. In my article I provide a number of examples of how markets seem to work well in allocating resources to intangibles-rich technology companies, in spite of what Lev would characterise as overly conservative accounting. The technology sector has boomed over the last couple of decades, in spite of apparently being hamstrung by the traditional financial reporting model. Lev does not respond in detail to these arguments but rather asks why we don't allow markets to solve all of our financial reporting problems. To some degree I agree with what seems to be an extreme position. After all, as Watts and Zimmerman (1983) pointed out some time ago, there is evidence that audited financial statements, in a form similar to what exist

today, have been used for hundreds of years, an so easily predate any form of securities regulatio

My argument is also more complex than Lev discussion implies. From an economic perspe(tive, I do think there is a role for regulators such (the FASB and the SEC. I agree with the position i the Garten (2001) report that regulators can hel improve financial reporting for intangibles in ; least two ways. First, no single entity has incer tives to develop an overall disclosure framewor for intangibles. Yet it seems that developing such framework would be useful in standardising an encouraging disclosure. Second, if we do agre that firms should disclose more information abo intangibles (if we can somehow ascertain that tl market is supplying too small a quantity of intai gibles disclosures) perhaps we should lower tl costs of these disclosures. For example, if thes disclosures subject firms to legal risks, perha| some type of safe harbour can be utilised to e1 courage more disclosure, similar to what is alreac done by the SEC in the area of forward-lookin statements.

3. Previous research on intangibles

Lev argues with my conclusion that there is no e` idence that current financial reporting requir(ments result in lower valuations for companies th; incur significant expenditures on research and d(velopment (R&D) and other intangibles. H claims here are again a bit too broad. Let me mak two points in response to what he has writte: First, I believe that it is not unreasonable to argt that studies of apparent mispricing in securiti(markets (i.e. of accounting anomalies) are difficu to interpret; see, for example, Kothari's (2001) r(view of capital markets research. Without a wel accepted model of expected returns, it is hard 1 know for sure whether stocks that appear to ea1 excess returns are truly undervalued or whether w have failed to correctly account for risk in mode ing expected returns. This is well-known and is nc controversial. Moreover, it is not correct to say, ;

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Lev does, that 'this criticism ... can be levelled at practically any market-based accounting or finance research.' I think it is clear that I am only talking about a particular class of studies.

Second, Lev does not address an important part of my argument. I argue that there is little evidence that changing the way we currently account for and report intangibles would change the capital market effects described in these studies. For example, in the US, R&D is transparently disclosed to investors on the income statement. Given that information about R&D is disclosed to investors, how do we know that changing the way we account for it would affect capital market decisions? Are we convinced that by capitalising R&D expenditures (or some part thereof), capital markets would somehow get it right? This seems to imply that capital markets rely mechanically on the way that accountants account for and report various items, which is a conclusion that I see as fairly controversial given extant evidence.

4. Growth in R&D and advertising
In my commentary, I plot aggregate real expenditures on R&D, capital, and advertising to show that aggregate R&D has grown significantly over the past 20–30 years, and that this growth outstrips that of capital expenditures, which are capitalised. This seems inconsistent with critics' claims that accounting for intangibles (the immediate expensing of R&D and advertising expenditures) has unduly handicapped investments in intangibles. Lev responds by showing that R&D and advertising intensities (expenditures deflated by sales) are basically flat, and argues that this instead is the right metric. I have a couple of observations about this. First, if we're interested in drawing conclusions about whether overall investment in intangibles is somehow 'too small', it seems to me that the aggregate numbers are of interest, similar to economists' focus on GDP. Put differently, it is not clear to me why we should be concerned that R&D as a percentage of sales has stayed roughly constant over time – perhaps this is the 'correct' level of R&D spending by firms. Second, by deflating by sales, the trend in these ratios will be affected by changes in the underlying Compustat population. Different industries naturally have different R&D intensities, which makes trends in aggregate ratios difficult to interpret.

5. What's to be done?
Let me address two points that Lev makes in this section. First, he agrees with those who point to the fact that market-to-book ratios are 'too high' as evidence that we should capitalise intangibles. My response to this argument is that the role of the balance sheet is *not* to arrive at a book value that tracks market value. I stand by this view even though Lev points out that the FASB takes a balance sheet approach and so would be 'surprised' by my view. Perhaps, but I think I am in good company in claiming that the balance sheet's role is not one of valuation (e.g. Holthausen and Watts, 2001).

Second, he claims that there is a good deal of evidence which supports his position that intangibles should be capitalised. Without going into detail about each of these studies, suffice to say that they are principally of the 'value relevance' type. As is discussed elsewhere (e.g. Holthausen and Watts, 2001; Skinner, 1996), there are good reasons why drawing policy conclusions from this type of study is problematic.

6. Postscript
Lev argues at a number of junctures that I make overly-sweeping statements. Yet at the end of his article he lays the blame for the NASDAQ tech bubble, the Enron accounting scandal, and the recent sub-prime financial crisis on our 'outdated' accounting model. While I could address each of these claims more specifically, it seems to me reasonable to simply observe that blaming the current accounting model for all of these problems is a rather sweeping conclusion.

References
Garten, J.E. (2001). *Strengthening Financial Markets: Do Investors Have the Information They Need?* Report of an SEC-Inspired Task Force.
Holthausen, R.W., and Watts, R.L. (2001). 'The relevance of the value-relevance literature for financial accounting standard setting'. *Journal of Accounting and Economics* 31: 3–75.
Kothari, S.P. (2001). 'Capital markets research in accounting'. *Journal of Accounting and Economics* 31: 105–231.
Skinner, D.J. (1996). 'Are disclosures about bank derivatives and employee stock options "value relevant"?' *Journal of Accounting and Economics* 22: 393–405.
Watts, R.L., and Zimmerman, J. L. (1983), 'Agency problems, auditing and the theory of the firm: Some evidence.' *Journal of Law and Economics* 26: 613–634.

What financial and non-financial information on intangibles is value-relevant? A review of the evidence

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Abstract—This paper evaluates what we have learned about the relevance and reliability of financial and non-financial information on intangibles from the value-relevance literature. Because value-relevance studies do not easily allow judgments about the reliability of information on intangibles, and this is an issue of central interest, this paper takes a rather wide look across a range of literatures to try to piece together some indirect evidence on both relevance and reliability. The evidence from a package of value-relevance and triangulation studies suggests research and development (R&D) is generally not reliably measured and may be less relevant in some contexts than others as well (e.g. established versus growth firms). Further purchased goodwill and some non-financial measures of brands and customer loyalty do not appear to be reliably measured. While a large number of financial and non-financial information is value-relevant, it is difficult to make categorical judgments about most other items, as differences in value-relevance could be due to different relevance or reliability, or both. Several rich areas for future research include designing direct tests of reliability, focusing on settings where intangibles are changing due to shocks, finding new economic benchmarks to test reliability, and studying the impact of accounting discretion and factors such as strategy and capabilities on value-relevance tests of information on intangibles. Two regulatory issues arising from this review paper are the gap in the reporting of separate line items of expenditures on intangibles; and the possibility that giving management discretion, with regulatory guidance, to report intangibles might facilitate more value-relevant information on intangibles.

Key words: value-relevance, intangibles, accounting regulation

1. Introduction

This paper evaluates what we have learned about the relevance and reliability of financial and non-financial information on intangibles from the value-relevance literature. The paper provides a rather wide-ranging view across the literatures in several disciplines, including economics, accounting, and management. This approach is motivated by the difficulty of testing for reliability using the value-relevance design. Since the reliability of information on intangibles for valuation is an issue of central interest, this paper provides an indirect, second-order assessment of reliability by piecing together the evidence from a large number of studies with different research questions and designs, and different measures of intangibles information and value.

Information is value-relevant when it is associated with investors' valuation of the firm as reflected in the firm's stock price. However, intangibles are generally unverifiable and uncertain in nature. Regulators and some researchers therefore hold reservations about *financial* disclosures on intangibles, including the costs and benefits to the firms, and the reliability for investors.[1] Value-relevance studies provide some insights on the concerns. If the information items of interest are significantly *associated* with the information set

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[1] For example, the Financial Accounting Standards Committee of the American Accounting Association commented on the Financial Accounting Standards Board 'Proposal for a New Agenda Project: Disclosure Information about Intangible Assets Not Recognized Financial Statements, August 17', September 28, 2001: 'If the FASB is to step in and (say) mandate the disclosure of certain information on intangibles, a question that seems relevant why have firms chosen not to disclose this information voluntarily. One answer is that there are likely to be costs associated with such disclosures, including both costs associated with measuring intangibles and proprietary costs of disclosing such information to competitors. Another answer may be that the benefits of these disclosures are not very large, perhaps because these disclosures are not very informative to investors due to low relevance or imprecise measurement. Whatever the case, it seems to us that the relatively low levels of voluntary disclosure in the intangibles area raise the possibility that disclosures in this area do not provide net benefits.'

that was used by investors to value the company, we can infer that the information is *relevant* (either directly or indirectly in a confirmative sense) for valuing the company. This statistical association with stock price also suggests that the information is *reliable* enough to be value-relevant. However, there are limits to what can be learned about reliability. Conclusions from value-relevance studies are not reliable if important factors are left out of the tests. We cannot tell whether investors actually *used* the information item of interest or whether one accounting method is optimal relative to another, or easily understand *why* information is value-relevant. Overall, it is difficult to directly test reliability and only a few studies do this.

Intangible investment is increasingly viewed by some as an important category of investment.[2] This view reflects an increasing tendency for technology to be embodied in intellectual property (IP) and labour where previously it resided in fixed assets. Without a long and comprehensive financial data series, however, it has proved impossible to conclusively test this hypothesis. At a more fundamental level, it is easy to argue that expenditures on intangibles are important because the stock of physical resources is finite and economic activity can only be sustained by the application of intellectual inputs (Webster, 1999). This presents a *prima facie* case for the value-relevance of at least some of the firm's expenditures on intangibles and the non-financial information bearing on the value and uncertainty associated with these expenditures.

Intangibles are also at the centre of an information gap that arises from the forward looking and uncertain nature of economic activity. In fact, all of the firm's investments, tangible and intangible, are uncertain by definition, since investment expenditures are outlays made in *anticipation* of future benefits (Fisher, 1930). However, while tangible assets tend to be standardised with control rights and a predictable stream of inflows, intangible assets tend to be heterogeneous and uncertain and subject to long development periods without control rights (Webster, 1999). This uncertainty engages managers and investors in a constant search for information to improve their foresight and decisions. Management have a central role in generating estimates of the future as they design and execute their firm's strategy (Knight 1921, Part III). These estimates embody a range of expectations about investor and consumer behaviours and wider economic conditions; and they are partially (and imperfectly) revealed in Generally Accepted Accounting Principles (GAAP) financial reports and the firm's interactions with the business environment.

In this paper, the literature is organised into six

categories of intangibles that relate to the firms' core value drivers and five different measurement approaches that reflect the influence of GAAP, researcher defined intangibles and non-financial input and output metrics. The review in this paper indicates that expenditures on R&D are value-relevant but appear to be less reliable than tangible items and to vary in the ability to signal future benefits. Purchased goodwill and some non-financial measures of brands and customer satisfaction are usually value-relevant but do not appear to be reliable indicators of future benefits. A wide variety of other financial and non-financial information on intangibles is value-relevant. However it is difficult to know whether variation in the size of the regression coefficient is due to differences in relevance or reliability, or both. Overall, it is difficult to obtain robust tests of reliability and addressing this gap is a key area for future research.

One gap in financial information that is evident from the review in this paper is the reporting of separate line items of expenditures on intangibles in the income statement. It is often argued that value creation is reflected in earnings. However, earnings are a summary number that is not necessarily useful for addressing the question of *how value is created*. For this purpose, information about value driving expenditures is relevant. There is also evidence that accounting regulators might better facilitate value-relevant disclosures on intangibles if they give discretion to management to report their firm's economic reality.

Section 2 begins with some background on the classification and economic properties of intangibles. Section 3 provides an overview of studies that examine the value-relevance of financial and non-financial information relating to intangibles. These sections consider how we might interpret this evidence in the light of wider economic conditions and other factors, such as omitted variables relating to the firm's competencies and strategy. Section 4 concludes with a discussion of what we have learned from the value-relevance tests, along with research design issues and some directions for future research.

2. Background
This section outlines the categories of intangibles used to structure the review in this paper, the economic properties of investments in intangibles, and the design of value-relevance studies, including a discussion of the concepts of relevance and relia-

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[2] This trend has been ascribed to authors including the following (see Webster 1999): Kendrick (1972), Caves and Murphy (1976), Magee (1977), Grabowski and Mueller (1978), Reekie and Bhoyrub (1981), Rugman (1981), Hirschey (1982), Caves (1982), Cantwell (1989), and Abramovitz (1993).

bility, which are the focal point of the value-relevance literature.

2.1. Classification of intangibles

The literature review in this paper canvasses a broad range of studies from the accounting, economic and management literatures. Papers included in the study are not exhaustive but are representative of the research questions and research designs observed in the different areas of study. The papers are classified according to six categories of intangibles as follows:

Technology resources
1. R&D expenditures and related IP

Human resources
2. Human capital

Production resources
3. Advertising, brands and related IP
4. Customer loyalty
5. Competitive advantage
6. Goodwill

These six categories of intangibles relate to three broad categories of the firm's resources: technology, human, and production resources.[3] Category one, R&D expenditures and the IP offshoots, such as patents, are aimed at developing technology, which is defined as a body of knowledge about how to do or make something (Metcalfe, 1998). Category two, human capital, relates to the resource generated by investing in employees. Categories three–six (advertising, brands and related IP; customer loyalty; competitive advantage; and goodwill), relate to production resources the firm has generated or acquired from prior periods' intangible investments. These six categories overlap, but, in the big-picture view, relate to the three broader elements of the firm's activities and resources, as outlined above. The six categories of intangibles are not exhaustive. Arguments can be made that other categories, such as environmental and social responsibility, are also important. The rationale for what is included is the need to be selective given the large numbers of papers but at the same time provide an

accurate account of the types of information that researchers have studied.

These six categories of intangibles are further partitioned according to five measurement categories.

1. Management reported assets (financial measures);

2. Researcher estimated assets (financial measures or non-financial metrics);

3. Annual expenditures (financial measures);

4. Input metrics (e.g. non-financial metrics, such as the number of scientists);

5. Output metrics (e.g. non-financial metrics, such as the number of patents).

The measurement categories reflect (1) the economics of the value creation processes and the researchers and practitioners' interests in the identification of value drivers and their empirical measures; (2) the influence of GAAP on the reporting of intangibles and the research problems of interest to practitioners and researchers; and (3) the influence of management discretion.

Annual expenditures and management reported assets

The logical starting point for researchers and investors is to identify how much has been spent on intangibles and the types of activities and rents involved. Once this information is known, rates of return from different types of expenditures can be computed, illuminating some of the drivers of firm performance.

However, this financial data is not available under current GAAP. Further, the factors that cause expenditures to give rise to future rents are not fully understood and change over time. In addition, management do not necessarily think in terms of 'intangibles' and do not always have incentives to voluntarily provide expenditures data of this type (e.g. for competitive reasons). Line item disclosures of expenditures on intangibles are therefore primarily limited to R&D with some research on advertising and labour costs where possible (e.g. advertising costs have not been available in the UK and are only patchily disclosed in the US). Hence, the research able to be undertaken on *annual expenditures on intangibles* is limited to a narrow range of expenditures.

Management reported assets are also limited under GAAP due to regulators' concerns about the reliability and verifiability of these items.[4] The relevance of the information for evaluating performance and value is seldom disputed. Reliability is the regulator's concern: does the recorded number reflect expected future benefits and what is the probability these expected benefits are realisable? As a result of these concerns, GAAP is conservative. This conservatism manifests as a two-way classification, *acquired assets* and *internal*

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[3] Researchers have come up with a variety of classifications of intangibles which are often bundled under the label of 'intangible capital'. See, for example, Abernathy and Clarke (1985), Webster (1999), Commission of the European Communities (2003), Ashton (2005), and Hunter, Webster and Wyatt (2005).

[4] *Relevant information* has predictive value and/or confirmatory value, and therefore has the ability to influence the economic decisions of users and is provided in time to influence those decisions. *Reliable information* is free from deliberate bias and material error and is complete. If information is reliable then GAAP maintains that it can be depended on to faithfully represent what it purports to represent or could reasonably be expected to represent.

expenditures, from which only the acquired intangibles can usually be recorded as assets.[5] This limits the research able to be undertaken on internally generated intangible assets. There are insights available on the value-relevance of *management reported assets* of both types (acquired and internal) from settings and time periods where GAAP allowed more liberal reporting of intangible assets (e.g. Australia, prior to the 2005 adoption of international accounting standards, or Ely and Waymire (1999), who study New York Stock Exchange listed companies allowed to report intangibles in the 1927 pre-SEC era).

Researcher estimated assets, and input and output metrics

Due to gaps in financial reporting under GAAP, to attempt the difficult task of studying optimal accounting methods, or to study the value drivers, some financial and non-financial measures of intangibles have to be *estimated by the researchers* themselves (e.g. the construction of R&D assets from R&D expenditures in Lev and Sougiannis, 1996. or the managerial skills measure in Abdelkhalik, 2003). Researchers studying value creation processes also focus on *input* or *output metrics* such as the number of scientists associated with the company (input metric: see Darby, Liu and Zucker, 1999) or patent metrics as a measure of technological innovation (output metric: see Hall, Jaffe and Trajtenberg, 2005).

In summary, Table 1 in the appendix summarises the literature using the six intangibles categories and five measurement classifications. The studies are also grouped on the value-relevance measure employed by the researcher: stock price levels, stock returns or financial performance measures. Percentages of firms with significant coefficients for the financial or non-financial information on intangibles and coefficients that are smaller than those on other tangible assets in the test (as only a rough guide to reliability) are provided in the body of the table.

We now briefly look at the economics of intangibles in the next section to get a feel for the properties that impact the relevance and reliability of information relating to intangibles.

2.2. Economic properties of intangibles

Expenditures on intangibles are usually investments since they are made in anticipation of future benefits (Fisher, 1930). Expenditures such as R&D and advertising may be employed directly in production to generate innovations and product market share. In addition, these expenditures can also give rise to intermediate (produced) assets, which are used in production. For example, intellectual property (IP) outputs are used in production to generate future rents in various ways, such as through the ability to charge a price premium or

control costs. R&D and advertising can generate patents, trademarks, brands or designs that provide property rights over innovations or generate market share and thereby permit the firm to appropriate the expected benefits from the earlier R&D and advertising investments.

There are complex lead-lag relations between early investments, intermediate (produced) assets, capital investments to produce the goods, and future expected benefits that are challenging for researchers to observe and model. Successful investments generate a range of intangible assets and future rents for the firm right across the value chain. But not all of the firm's outlays are successful in creating value.

From the investors' perspective, stock price reflects the capital market's expectation of the firm's future cash flows from the firm's investments. Investor expectations are formulated from a diverse set of information. This information set presents some problems for investors and managers. Chief among these is the fact that this set can never be complete because the future is uncertain.[6] The available information is imperfect and not held as a complete unit. Instead, the information exists as 'dispersed bits of incomplete and frequently contradictory knowledge' in the hands of individuals (Hayek, 1945: 519).

'At the bottom of the uncertainty problem in economics is the forward-looking character of the economic process itself. Goods are produced to satisfy wants; the production of goods requires time, and two elements of uncertainty are

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[5] Under the previous UK standard, FRS 10 *Goodwill and Intangible Assets*, which is now superseded by IFRS 3 *Business Combinations*, intangible assets are non-financial fixed assets that do not have physical substance but are identifiable and are controlled by the entity through custody or legal rights (para. 20). Internally developed intangible assets can be capitalised if there is control and a readily ascertainable market value. According to FRS 10, 'readily ascertainable market value' is the 'value of an intangible asset that is established by reference to a market with a homogenous population of assets and the market is active as evidenced by frequent trades for that population of assets.' Since active markets of this type generally do not exist for intangibles, only acquired intangibles can be routinely capitalised. SSAP 13 *Accounting for Research and Development* allows capitalisation of development costs only if future benefits are virtually certain. The International Accounting Standards Board in IAS 38 *Intangible Assets* has asymmetric rules for acquired intangibles and internal expenditures on intangibles. Under IAS 38, there is a presumption that acquired intangible assets are measured reliably and are therefore capitalisable assets. However, to be treated as assets, internal expenditures on intangibles must pass six additional tests as set out in IAS 38 paragraph 57.

[6] Shackle (1974: 3) points out that managers do not actually *know* their circumstances in the sense of having complete or perfect information; there is a '... lack of knowledge, unlike actuarial probability calculations which require substantial knowledge' (Shackle as cited in Ford (1994: 82); see Knight, 1921).

introduced, corresponding to two different kinds of foresight which must be exercised: First, the end of productive operations must be estimated from the beginning. It is notoriously impossible to tell accurately when entering upon productive activity what will be its results in physical terms, what (a) quantities and (b) qualities of goods will result from the expenditure of given resources. Second, the wants which the goods are to satisfy are also, of course, in the future to the same extent, and their prediction involves uncertainty in the same way. The producer, then, must estimate (1) the future demand which he is striving to satisfy and (2) the future results of his operations in attempting to satisfy that demand.' Knight (1921, III.VIII.8)

The extent of the problem for managers depends on factors such as the technical difficulty of the firm's products and processes, the extent to which the firm's assets and routines are standardised and predictable versus non-standard and unpredictable, and the strength of property rights (Dosi, 1988). Investors have the problem of decision making under uncertainty, which is compounded by information asymmetry between managers and investors, and among investors themselves. Investors also have different levels of sophistication and incentives to search for value-relevant information. Some investors are therefore more informed than others. These information asymmetries are exacerbated by the natural optimism of managers about their firm's prospects.

What economists have learned about production and growth is important for value-relevance studies because information is value-relevant only if it is capable of reflecting some aspect of the firm's economics. For example, we expect expenditures on training to be value-relevant if the expenditures are associated with increases in the skills and productivity of employees. Economists find that expenditures on intangibles are important for building the firm's capabilities to exploit emerging opportunities and meet profitability goals (Cohen and Levinthal, 1989).[7] These expenditures help to differentiate the firm's value creating activities and routines so they are hard for rivals to copy and help reduce the number of uncontrolled factors impacting the firm's operations (Webster, 1999). As a result, intangibles are contingent by nature and intrinsically exposed to economic states. For example, the benefits from training staff are contingent on the state of the labour market as well as the firm's own ability to attract, retain and motivate the employees.

Expenditures on intangibles are distinguished from tangible investments based on the heterogeneous and non-standardised nature of intangible investments (Webster, 1999). Heterogeneity and standardisation are a function of how often tasks have been performed before and the ease of copy-

ing. Plant, property and equipment are relatively standardised compared with payments for intellectual inputs from employees and payments for produced intangible assets from outside the firm. The outputs produced from the intellectual inputs of employees, and intangible assets purchased from outside the firm, are more difficult to control and predict compared with the outputs from machines (Webster, 1999).

A further source of uncertainty is the inability to assign property rights over people and over some types of assets (e.g. R&D). The value is often tied up with people who cannot be owned or attributable to rents that are easily dissipated by rival firms (e.g. brands) (Webster, 1999). Property rights over intangible investment may be unavailable for extended periods while a project is developed. By contrast, investment in tangible assets occurs when the company is ready to produce products.

In summary, the economic properties of intangibles reflect several fundamental uncertainties, including an intrinsic exposure to changing economic states, an unstandardised and heterogeneous nature, and difficulty obtaining property rights. Expenditures on intangibles are therefore *less reliable* by definition compared with tangible assets. Accordingly, while *financial* information on intangibles is likely to be relevant for valuing the firm, it is less likely to be reliable, especially in the earlier stages of the investment. *Non-financial* information is likely to be value-relevant if it is sufficiently salient to the firm's economic reality and precisely measured to be informative about the earnings effects of the firm's interaction with its environment.

2.3. Relevance, reliability and value-relevance tests

value-relevance studies test for an association between information items of interest and a stock price or financial measure of value, for example, the market value of equity, stock returns or future earnings. The tests rely on stock market efficiency.[8]

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[7] The intangible investment is not confined to R&D but involves a bundle of expenditures and activities of different types, including strategic planning, design, feasibility, development, production, marketing, distribution, advertising, customer service, management of intellectual property portfolios, and building of organisation and information infrastructures and routines (Abernathy and Clark, 1985).

[8] The assumptions include (see Lev and Ohlson, 1989: 297–298): prices in the pre-disclosure economy are unbiased estimators of the prices in the post-disclosure economy; individuals have homogeneous information and identical beliefs about the implications of the intangibles information; and the economy is efficient in the sense that more information is (Pareto) better than less information so that nobody is worse off while additional trading on the information would make some better off.

The regressions used for value-relevance tests *associate* the value-relevance measure on the left-hand side of the equation with the information items of interest and other variables on the right-hand side of the equation.

Market value of equity = (1)
$b_0 + {}_{b1}$Book value of equity +
b_2Earnings +
b_3Information of interest + *error*

Stock return = (2)
$b_0 + b_1$Earnings +
b_2Change in Earnings +
b_3Information of interest + *error*

Financial performance = (3)
$b_0 + b_1X +$
b_2Information of interest + *error*

The existence of a statistical association is determined by looking at the estimated regression coefficients, the 'b's in equations (1)–(3) and testing whether they are significantly different from what was expected. If the test statistic is significant, we can infer that the information of interest is *associated* with the value-relevance measure on the left-hand side.

2.3.1. What can be inferred?

We can infer that the information item of interest *is associated with the information set that investors used* to value the firm's equity, and the information item is therefore value-relevant. But there are at least two things we cannot infer. First, we cannot infer that investors actually *used* the information of interest to value the firm. Second, we cannot infer from the statistical test alone that the information of interest causes the level of market value, changes in stock price, or financial performance. The statistical test only tells us whether the value-relevance measure and the information of interest are statistically associated.

It is also difficult to infer optimal accounting policies from value-relevance tests. Holthausen and Watts (2001) argue this is because value-relevance tests provide a statistical association that is not backed up by theory and modelling of the underlying links between accounting, standard setting and value.

A factor adversely impacting the inferences available from value-relevance studies is the problem of omitted correlated variables. That is, factors of varying importance that are associated with the left- and right-hand side variables are not included in the equation. For example, Holthausen and Watts (2001) point out that expected future rents are omitted from value-relevance regressions. Omissions like this can distort the 'b' coefficients in equations (1)–(3) and lead to erroneous conclusions. One common problem is the effect of differ-

ences in firm size on the test results. Size differences can produce significant results that have little to do with the intrinsic attributes of the item of interest. For example, a significant test for the 'b' coefficient on goodwill might just show that large companies have more goodwill.

There are also trade-offs in the choice of the value-relevance measure. Shevlin (1996) points out that, for investment variables, the sign is more intuitive in the stock levels regression compared with the stock returns model. That is, an unexpected *change* in investment can be good or bad news, but a significant association for the total amount of the investment (e.g. R&D expenditures) is expected to be positively related to value-relevance metrics. Further, there may be little change in the variable of interest in a narrow return interval (e.g. change in stock price over a quarter or a year). For example, customer satisfaction for an established brand company such as Coca-Cola might be highly value-relevant in a stock price levels regression but the value might change very little on an annual basis. Finally, *financial measures* are limited to the extent that they do not reflect the capitalised value of the expected benefits from intangible assets. We need to consider the impact of these trade-offs in drawing conclusions from value-relevance studies.

2.3.2. Concepts of relevance and reliability in value-relevance studies

Value-relevance tests are joint tests of relevance and reliability (e.g. Barth et al., 2001). However, it is difficult to infer the amount of 'value-relevance' that is due to relevance and the amount that is due to reliability.

Figure 1 graphically depicts the relevance and reliability concepts. Conceptually, relevance relates to two aspects of the underlying economics of the investment. The first is a value construct of some kind, such as expenditures on R&D or acquisition of goodwill. The second is the process by which value is expected to be created (e.g. the R&D is expected to produce value by generating a new large pharmaceutical molecule to be used in a drug with a known purpose). Relevance of information is decreasing to the extent that the value creation process is ill-defined. An example is purchased goodwill, which is a residual from a commercial transaction that relates to an unspecified value creation process. When the relevance link is weak (as defined in terms of an ill-defined value creation process), such as in the case of purchased goodwill, then the next link in the value-relevance chain, the reliability link, is also going to be weak. This way of thinking benchmarks reliability against the uncertainty of the value creation process. That is, it is going to be difficult to measure something that defies definition in terms of how the value is going to be created.

Figure 1

1. Impacted by uncertainty about link from value construct to value creation (e.g. purchased goodwill)
2. Impacted by GAAP (e.g. full expensing of R&D)
3. Impacted by management discretion
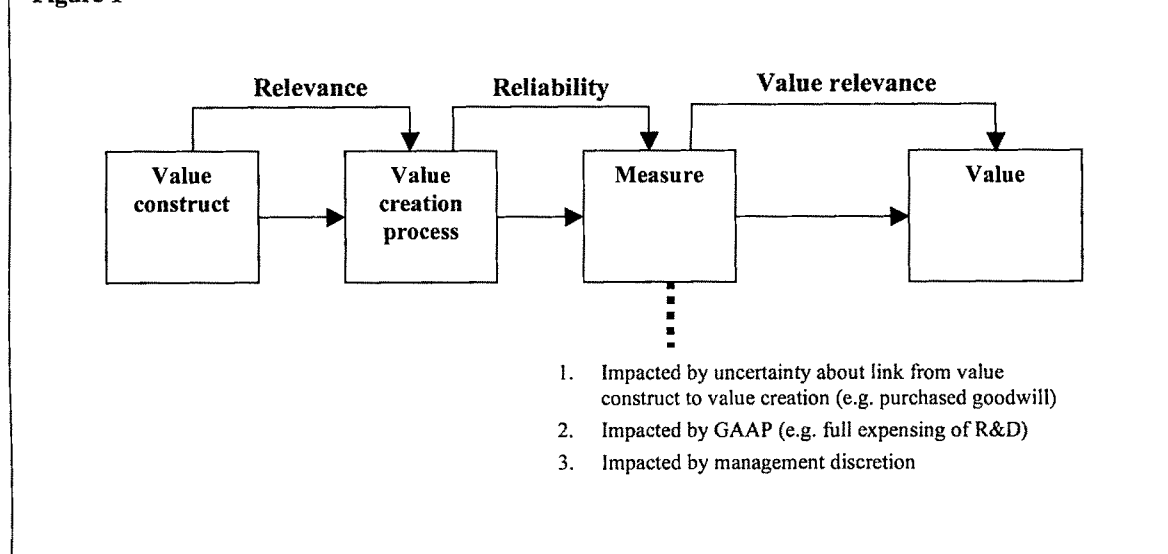
In Figure 1, a *reliable* measure is capable of conveying information about the future benefits expected to flow from an underlying investment. Usually, the measure relates to a quantum of expenditure, but the measure can (less commonly) be a revaluation amount. Reliability refers to two links. The first is the relevance link. For reliable measurement, there must be a reasonably well defined value construct link to a known value creation process. Second, a measure is required that is capable of reflecting the economic substance of the value construct and process. An example of a measure that falls down at the reliable measurement stage is R&D expenditures. Specifically, the individual firm aggregates various types of expenditures into their R&D measure and has a good idea of the value creation process. However, for external parties to the firm, the R&D expenditures number reported in the income statement are too general to convey highly reliable information to investors about value creation and expected benefits. This is because the R&D aggregates expenditures relating to different kinds of *undisclosed* value constructs and value creation activities, not all of which are going to lead to expected future benefits. Hence, conceptually, the R&D expenditures provide relevant information about value creation, but the measure is not a reliable indicator of future rents.

Reliability is affected by a number of factors. One is *GAAP rules*. For example, as discussed, the aggregate nature and full expensing of R&D expenditures adversely impacts the reliability of the R&D measure. A second factor is economic *uncertainty*, which adversely impacts reliability if it causes the link from the value construct to value creation to be ill-defined (e.g. there is uncertainty about how basic research will generate value)

and/or generates uncertainty about the probability of future benefits. Reliability is also affected by a third factor, *management discretion*. The effect is positive if management have incentives to communicate credibly with investors and potentially negative if management's interests are not aligned with shareholders' interests.

To distinguish relevance and reliability effects in value-relevance studies, and to obtain a direct test of reliability, it is necessary to develop the relevance and reliability links in setting up the study. This is a difficult task. One of the few studies that do this is Healy, Myers and Howe (2002). They simulate financial accounting data for a sample of 500 pharmaceutical companies. Simulation ensures that the value creation process, the R&D expenditures, and the firm value are known. As a result, Healy et al. (2002) are able to examine the value-relevance of R&D accounted for in different ways under GAAP, as well as the effects of economic uncertainty and management discretion.

Another way to think about reliability is to compare the regression coefficient for the intangible item with the size of the coefficient for more reliable assets. As a rough guide, we expect more reliable information to have a larger coefficient. However, this comparison is difficult because size difference in the '*b*' coefficients could be due to differences in relevance or reliability, or both. Very few of the value-relevance studies directly address the question of reliability.

As a second-best alternative, we can get some indirect insights by selecting a wide range across the literature from different disciplines (e.g. economics, accounting, management, and marketing) to let the overlapping nature of the studies tell the story. This is the approach taken in the review following in Section 3.

3. What information on intangibles is value-relevant?

Section 3 reviews a cross-section of the literature organised according to the six categories of intangibles: R&D and related IP; advertising, brands and related IP; customer loyalty; human capital; competitive advantage; and goodwill. Each category of intangibles is reviewed according to the five types of measures that were introduced in Section 2.1.

3.1. R&D and related IP

This section considers R&D and its IP output, mainly comprising patents. IP refers to the laws governing creations of the mind, including inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. The two categories of IP are *industrial property* (patents, trademarks, copyright, designs, circuit layouts, and plant breeder's rights) and *copyright* (literary and artistic works, such as novels, poems and plays, films, musical works, drawings, paintings, photographs, sculptures, and architectural designs).[9] IP is designed to grant a short-term monopoly so the entrepreneur can capture value from their investments.[10]

Most research focuses on patents because patents measure knowledge creation.

Expenditures on successful R&D give rise to product and process innovations and a product pipeline to ensure a sustainable earnings stream into the future and value. R&D expenditures are inputs that also give rise to IP outputs, which may comprise patents, trademarks and designs. IP is employed in production to produce goods and services, help appropriate expected benefits due to the short-term monopoly, and potentially support a price premium.

3.1.1. R&D and IP – management reported assets

R&D and IP are important factors of production, particularly for high-technology companies (Griliches, 1990), but are not routinely capitalisable under GAAP in most countries (e.g. usually expensed under IAS 38 *Intangible Assets*). On the one hand, *producing* technology engages the firm in relatively unstructured and uncertain problem-solving activities (Dosi, 1988). *Adopting* technology also engages firms in costly problem solving and learning activities. The uncertainty associated with R&D and the associated projects leads to full expensing of R&D. Financial statements of R&D intensive companies usually do not fully capture the economics of these activities.

Consistent with this idea, Kwon (2001) finds management reported GAAP numbers are less value-relevant for high-technology firms than for low-technology firms. His evidence suggests that this difference is due to the greater impact of

GAAP accounting conservatism in high-technology firms compared with low-technology firms.

Consistent with uncertainty about future economic benefits, Wyatt (2005) finds that R&D assets are not significantly associated with stock returns in the Australian setting. This evidence is from the time period prior to the 2005 adoption of international financial reporting standards (IFRS) in Australia. At that time, companies were allowed to capitalise applied R&D expenditures, but it was not mandatory. There was no accounting standard for identifiable intangible assets at the time. As a result, management had wide discretion to choose not to record R&D assets and instead record a wide array of other intangibles assets that are much more informative about the value creation process.[11] In contrast to the lack of R&D asset value-relevance, Wyatt finds that the identifiable intangible assets are significantly positively related to stock returns. Her evidence further suggests that the identifiable intangible assets are significantly associated with technological factors driving the firm's production function. However, the R&D assets are not. This finding suggests why the R&D assets are not value-relevant.[12]

By contrast, Deng and Lev (1998) find R&D-in-process assets purchased and valued as part of an acquisition are value-relevant. They use a sample of 400 companies acquiring R&D in-process assets in the years 1985–1996. Both Wyatt (2005) and Deng and Lev (1998) use contemporaneous

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[9] See http://www.wipo.int/about-ip/en/. Recent IP developments also include technological protection measures (TPM) and digital rights management (DRM). TPMs are used in material such as sound recordings, films and computer software, as well as electronic artistic and literary works (e-books). DRM is technology used to control access to digital works or devices, to protect copyright in those works or the works used on the devices. For example, the iTunes store incorporates DRM into its music, to restrict copying. There is no known evidence on the value-relevance of these IP.

[10] IP is designed to 'create a market for knowledge by assigning property rights to innovators which enable them to overcome the problems of non-excludability while at the same time, encouraging the maximum diffusion of knowledge by making it public' (Geroski, 1995: 97). See Griliches et al. (1987); Trajtenberg (1990); Austin (1993); Hall et al. (2001).

[11] To outsiders of the firm, R&D *expenditures* are a bundle of unknown expenditures with unknown links to future benefits. R&D *assets* are only marginally more defined: while capitalisation of assets is a signal of future benefits beyond the current period, the aggregate nature of R&D precludes investors making precise links between the expenditures and value creation in the absence of other information about the firm's R&D success rate.

[12] Wyatt (2005) finds that management's choice to record intangible assets is associated with the strength of the technology affecting the firm's operations, the length of the technology cycle time, and property rights-related factors that affect the firm's ability to appropriate the investment benefits. These effects are more important than other contracting and signalling factors consistent with the underlying economics operating as a first-order effect as envisaged by GAAP.

stock return as their value-relevance measure. The main points of difference are the economic significance of the acquired R&D-in-process assets, which represent an average 75% of the acquisition cost. By contrast, the R&D assets reported by Australian companies are internal expenditures that comprise an average of 1% (median 0%) of the firms' total assets. Further, compared with the US companies, the Australian companies had discretion to report more informative intangible assets, reducing the need to communicate with investors via the more uncertain R&D assets.

The US Financial Accounting Standards Board (FASB) has required full expensing of R&D costs since 1974 (Statement of Financial Accounting Standards No. 2). In a break from this strict standard, the FASB issued Statement of Financial Accounting Standards (SFAS) No. 86 *Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed* in August 1985, which allows the capitalisation of software development costs once technological feasibility of the software is established. Givoly and Shi (2007) examine the capitalisation of software development costs by IPO firms. They test and find capitalisation is associated with lower underpricing of the stock on the first day of trading. They interpret this as evidence that the capitalisers are subject to less uncertainty about the success of their software investments but do not test whether these capitalised costs and lower underpricing predict future performance. An open question is whether capitalised software is enough information to distinguish the prospects of the newly listed software companies that face significant technological and competitive pressures in the industry, without the benefit of a minimum efficient scale.

For a sample of computer programming and prepackaged software firms surviving for at least three years, Aboody and Lev (1998) find the software assets reported under SFAS No. 86 are value-relevant. However, only 25% of the *total* software development costs are capitalised by these firms. Eccher (1998) suggests one explanation for this is the *working model* approach to software development where software is completed (technically feasible) late in the development period, resulting in few capitalisable costs. The firm's software development strategy therefore appears to be relevant to a full interpretation of value-relevance tests for software costs.

A further issue examined by Aboody and Lev (1998) is the petition by The Software Publishers Association in 1996 to abolish SFAS No. 86. Aboody and Lev suggest this petition was motivated by increasingly negative effects of the accounting standard on earnings, in a maturing industry. However, they also find higher analyst earnings forecast errors for capitalisers compared

with expensers, which suggests there is some attribute of the capitalising firms that makes their earnings harder to predict compared with expensing firms. Given there is more information in capitalised intangible assets for growth compared with steady state firms, one possibility is the capitalisers are growth firms that are more risky than the expensing firms.

Ken Wasch, president of *The Software Publishers Association*, sheds some light on the risk issue. He argues there is significant uncertainty even at the point of technical feasibility about the success of the software 'due to factors such as the ever-increasing volatility in the software marketplace, the compression of product cycles, the heightened level of competition and the divergence of technology platforms' (Aboody and Lev, 1998: footnote 3).

Economic studies show these factors do impact the firm's success rate and performance (e.g. Audretsch, 1995). For example, Agarwal and Gort (2001) find the average cycle time from an idea to a viable product has decreased from 33 years in 1900 to 3.4 years in 1967–1986. Further, as the cycle time decreases, costs and the level of competition escalates (Scherer, 1966; Graves, 1989; Ittner and Larcker, 1997).[13] In the US telecommunications industry, Banker, Chang and Majumdar (1995) find increasing competition is associated with declining profitability. Consistent with technological innovation and competition conditions impacting the success rate of R&D, the value-relevance of R&D varies across time periods and industries (Hall, 2000) and across technological sectors (Greenhalgh and Rogers, 2006).[14] Cohen and Klepper (1992), among others, show there are usually only a small number of high performing R&D companies in an industry. Consistent with this evidence, Ceccagnoli, Arora, Cohen and Vogt (1998) find that differences in the firms' capabilities affect their ability and incentives to generate innovations from R&D and absorb the innovations of rivals (i.e. take advantage of rivals' R&D). Several studies find financial leverage is negatively related to the level of R&D consistent with a life-cycle effect (Bernstein and Nadiri, 1982; Hall, 1991).

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[13] Examples of additional organisational competencies leading to shorter cycle times and superior performance are the use of cross-functional teams, customer involvement in the innovation process, advanced design tools, and higher quality of resulting products (see Ittner and Larcker, 1997).

[14] Hall (1993a, 1993b) finds the late '60s and '70s were periods of higher valuation of R&D in capital markets, which declined abruptly during the eighties in the United States. It is generally held this decline relates to company restructuring and the declining value of R&D assets due to rapid technical change in particular industries, including electrical equipment, computing, electronics and scientific instruments (i.e. R&D benefits were relatively short-lived).

In summary, R&D and IP are not commonly reported as assets by managers under GAAP, and, therefore, evidence on value-relevance is limited. Assets found to be reliable enough to be value-relevant include independently valued R&D-in-process, capitalised IP, as part of the identifiable intangible assets voluntarily recognised by Australian firms, and capitalised software R&D under SFAS No. 86. R&D assets are not value-relevant in the Australian setting, when companies could report more informative identifiable intangibles, which are presumably more reliable than R&D assets (i.e. some of the identifiable intangibles are output from successful R&D). No other specific inferences about reliability are possible from this evidence. Finally, a range of factors are important for understanding the probable success and hence reliability of R&D, including cycle time-based competition, industry structure, firm-specific capabilities, life-cycle stage, and technology-conditions.

3.1.2. R&D and IP – researcher estimated asset

The US FASB has been sceptical about the reliability of R&D. In SFAS No. 2 *Accounting for Research and Development Costs* (para. 41), the FASB states that a 'direct relationship between research and development costs and specific future revenue generally has not been demonstrated'. Lev and Sougiannis (1996) examine this proposition by estimating the R&D assets and amortisation that would have been reported by US companies had they been allowed to capitalise R&D. They restate the earnings and book value of shareholders' equity using these estimates of R&D assets and amortisation and find the (*pro forma*) R&D assets are value-relevant. They also find an association with future period stock returns, suggesting that the *pro forma* R&D is relevant but not that reliable. This forward relation leads them to conclude that R&D intense stocks either are mispriced because investors do not understand conservative accounting or attract a risk premium due to the uncertainty associated with the R&D outcomes.

The risk premium conclusion is consistent with Boone and Raman's (2001) evidence that R&D intensive firms have higher bid-ask spreads compared with less R&D intensive firms. Chambers, Jennings and Thompson (2002) argue that, if the full expensing effects of R&D on the financial statements mislead investors, then excess returns earned from trading strategies associated with R&D intensive firms may be reduced or eliminated by alternative R&D accounting policies that better reflect the expected future benefits of R&D activities. They tested this hypothesis, and their evidence suggests the ability to earn excess returns from trading on R&D intensive companies is not due to GAAP-induced mispricing. The excess re-

turns may therefore be a risk premium consistent with the economic properties discussed in Section 2.2. Lev, Sarath and Sougiannis (2005) also provide evidence that the firms with a high growth rate of R&D relative to their profitability are systematically undervalued. Both the risk and mispricing conclusions are consistent with R&D being a relevant but not reliable indicator of expected inflows from R&D. It is possible that the risk is at least partly due to the aggregate nature of R&D, where the firm bundles a range of expenditures whose identity and links to future benefits are not visible to outsiders.

The studies reviewed so far suggest that R&D is reliable enough to be value-relevant in general. However, as discussed at the beginning of Section 3, it is difficult to obtain direct tests of the reliability of R&D using stock price or financial measures as an economic benchmark.

One of the few studies able to provide direct insights on the reliability of R&D is Healy, Myers and Howe (2002). They use a simulation model for a pharmaceutical company to generate 32 years of data for 500 companies from formation to steady state. Parameters from these processes are used to construct a cash flow model and financial statements. The model simulates the drug discovery (R&D input) process (year 1), to commercial launch of a series of products (year 14), to maturity and expiry of patent (26 years), using underlying costs, probabilities of success and revenues. The model allows for some of the dynamic aspects of the industry, for example, drugs that are significant innovations, average or commercially unsuccessful drugs, rivals' competitive entry with competing drugs, and next generation drugs. The economic value of the simulated R&D firm is known, and the imposition of different accounting rules gives insights into the relevance and reliability of R&D.

Using the simulation data, Healy et al. (2002) investigate the relevance and reliability of R&D under three methods of accounting: (1) immediate expensing; (2) full cost capitalising of all R&D except basic research and expensing over the life of the drug once in commercial production; and (3) successful efforts made in capitalising successful drugs and writing down those found to be unsuccessful. They find the successful efforts method of accounting for R&D is most value-relevant. However, their tests suggest there are large measurement errors in the financial accounting data under all the accounting methods examined. Hence, their study suggests the R&D is relevant but not that reliable due to economic uncertainty about the success rate of the individual company's R&D.

In summary, researcher estimated R&D assets are reliable enough to be value-relevant. However, R&D assets are also associated with *future* stock

returns, suggesting investors do not find expected benefits from R&D reliable enough to fully impound in this year's (contemporaneous) stock price. Healy et al.'s (2002) evidence is consistent with R&D assets being relevant but not a reliable indicator of future rents. The Healy et al. paper is one of the very few able to provide direct evidence on reliability. An important area for future research is one that devises research designs capable of both distinguishing between relevance and reliability and provides direct tests of reliability.

3.1.3. R&D and IP – annual R&D expenditures

Annual expenditures on R&D related IP are not routinely reported. However, R&D expenditures are available from surveys and as a result of accounting standards in some countries, for example, the US standard SFAS No. 2 *Accounting for Research and Development Costs* and the R&D data from the *Industry R&D Survey* conducted by the US Census Bureau and National Science Foundation. Using these data sources, a large number of studies find a positive significant relationship between R&D expenditures and investors' valuation of the firm as reflected in stock price.[15] However, while R&D is generally value-relevant, taken as a package, the evidence below suggests R&D expenditures are not that reliable as an indicator of the timing and magnitude of future benefits. In particular, investors do not appear to find it easy to evaluate the future earnings implications of the R&D expenditures, consistent with the uncertainty properties of intangibles outlined in Section 2.2.

One reason R&D expenditures are not reliable indicators of future rents is that these outlays do not directly *produce* a stream of revenues from the sale of products. Conceptually, earnings from R&D are more variable because R&D involves search and discovery and problem-solving activities whose success is uncertain (Dosi, 1988). Using the variability of future earnings (variance of realised annual earnings over five years) as the dependent variable, Kothari et al. (1999) provide evidence that the benefits from R&D expenditures are more variable, and hence less reliable, than the benefits from capital expenditures for a sample of over 50,000 firm-year observations for 1972–1992. Kothari et al. find a coefficient on current R&D expenditures about three times the coefficient on current capital expenditures (controlling for leverage and firm size). Amir et al. (2002) find that this greater future earnings variability effect is largely confined to firms in more R&D intensive industries and not to other industries.

Some doubt exists over the completeness of the measures of R&D expenditures. Hansen and Serin (1997) show that R&D expenditures are a hidden cost in some low-technology industries, for example, process innovation costs that are not separately reported but are bundled with production costs in manufacturing. Further, companies do not disclose what types of expenditures are actually included in their R&D expenses. Some expenditure included in R&D has more direct implications for future earnings and earnings variability compared with other expenditures.

Overall, this evidence on the greater variability of earnings from R&D is consistent with the different purposes of the R&D and capital investments: R&D produces innovations while capital expenditures produce products that embody the innovations. This relation has been demonstrated empirically using Granger causation tests (Lach and Schankerman, 1989; Lach and Rob, 1996). That is, R&D comes first and fixed capital investment comes later, once fixed assets are needed to produce the goods ready to sell to customers. Further, current R&D includes soon-to-be successful as well as some (potentially a lot of) unsuccessful expenditures, which suggests fairly clearly that evaluating R&D expenditures alone, in the absence of information about the probability of success, will not provide a lot of insights on value.

Sougiannis (1994) provides indirect evidence on the reliability of R&D expenditures for a sample of 573 US firms engaged in R&D between 1975 and 1985. Sougiannis estimates two equations capturing (1) the R&D association with earnings, and (2) the R&D association with market value.[16] Sougiannis finds one dollar of R&D is associated with a two-dollar gross profit increase over a seven-year period and a five-dollar increase in market value. However, he finds only the current R&D expenditures are positively and significantly associated with the firm's market value of equity. By contrast, past R&D is unrelated to the market value of equity. This result suggests no more benefits are expected from the past R&D,

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[15] See Ben Zion (1978); Ben Zion (1984); Griliches (1981); Hirschey (1982); Connolly, Hirsch and Hirschey (1986); Jaffe (1986); Ettredge and Bublitz (1988); Bublitz and Ettredge (1989); Chan, Martin and Kensinger (1990); Connolly and Hirschey (1990); Griliches, Hall and Pakes (1991); Shevlin (1991); Hall (1993a); (1993b); Johnson and Pazderka (1993); Megna and Klock (1993); Chauvin and Hirschey (1994); Sougiannis (1994); Lev and Sougiannis (1996); Deng and Lev (1998); Stoneman and Toivanen (1997); Aboody and Lev (1998).

[16] Earnings and price are endogenous in this specification: (1) (Earnings after tax & before extraordinaries, advertising and R&D expense) = f (net capital stock measured as inflation adjusted items: PPE+inventories+intangibles+other investments, advertising; and current and lagged R&D expenditures); (2) Price/BV equity = f (book value equity, abnormal earnings adjusted for R&D expensing and tax, R&D tax shield, current R&D costs, lagged R&D outlays). From this analysis he derives (a) the total effect of past and current R&D on earnings, (b) the indirect effect of R&D on stock price through earnings, and (c) the direct effect of R&D on stock price.

meaning none of the past R&D are assets and all the benefits have already been received, which seems implausible. A more plausible alternative explanation is that investors are *uncertain* about the probability of future benefits from the *past* R&D. Overall, Sougiannis' evidence suggests R&D is value-relevant, but the time series of R&D is not a reliable predictor of future rents.

Green et al. (1996) cast doubt on the value-relevance of R&D expenditures in the UK setting for 1990, 1991 and 1992. They find the R&D expenditures are significant in 1991 but are not reliably value-relevant in 1990 and 1992. However, their dependent variable is the *difference* between the market value and book value of shareholders' equity (MVE-BVE). This variable provides a test of the relations between R&D and the *excess* market value over the book value of assets, not the *level* of the firm's market value of equity. This *excess* may not fully capture investors' expectations of the lead/lag relations between R&D and the expected benefits. Further, this excess variable is regressed on earnings, current R&D expenses plus a number of control variables, some of which are likely to be correlated with (proxy for) the level of R&D expenses or the risk of the R&D, leading to a value-irrelevance result.[17] More recent UK evidence for 1990–1994 (Stark and Thomas, 1998) and 1990–2001 (Akbar and Stark, 2003) finds that R&D is value-relevant in the UK setting.

Another explanation for the Green et al. (1996) results is a lack of power due to under (or no) reporting of R&D expenditures by the UK firms. Stoneman and Toivanen (1997) encounter this problem in their UK study. They employ a research design that allows for sample selection bias due to the non-reporting of R&D. For 1989–1995, they find R&D is value-relevant for UK firms. The valuation multiple ranges between zero and 4.3, and they find the multiple varies over time and across the firms.

One further issue in the UK setting, for R&D value-relevance studies prior to 1996, is the UK GAAP impact on reported intangibles. Companies predominantly wrote off goodwill to an equity account in this time period but were able to report identifiable intangibles such as brands. If the goodwill write-offs significantly understate intangible assets, then it is possible that regression coefficients on assets in the model could be biased due to omitted correlated variables. Shah, Stark and Akbar (2007) consider the issue of omitted advertising costs in the UK studies of the value-relevance of R&D. Advertising cost data had not been available in the UK until the advent of the ACNielsen MEAL data. This organisation monitors media outlets and assigns standard costs to advertising activities. Using this data to control for advertising costs, Shah et al. (2007) find R&D is (positively) value-relevant in the UK for all

firm size groups and for manufacturing and non-manufacturing sectors, as well as the R&D intense pharmaceutical, biotechnology, electronics, and electrical equipment sectors.

Several studies examine factors that impact the value-relevance of R&D expenditures. One important factor is the project stage. For example, Shortridge (2004) provides evidence that the track record of *new drug approvals* conditions the relation between R&D and stock price for a sample of US pharmaceutical companies. Hand (2001) finds investors expect more successful outcomes from *more intense R&D* and find more information in R&D for *growth firms* rather than established biotechnology firms. Investors therefore appear to understand that the information in R&D about future benefits varies according to the firm's life-cycle and project stage.[18]

A further issue in interpreting the R&D studies is the model specification. In contrast to other accounting studies, Hand (2001) uses a Cobb-Douglas function (commonly used in economic studies) which allows for the diminishing marginal return from R&D. More generally, Hall and Kim (1999) report that non-linear and log-linear functional forms best approximate the R&D relation with stock price. A survey of the economic literature suggests the likely reason for non-linearity is technological and firm life-cycles, and the changes in returns to investment at inflection points in the cycles (Geroski, 2000). This non-linearity is corroborated by accounting studies that suggest the relation between earnings, as a summary measure including R&D and other expenditures, and stock returns is non-linear (Cheng et al., 1992; Freeman and Tse, 1992; Das and Lev, 1994; Subramanyam, 1996).

In summary, taken together, the evidence in this section from a variety of different research designs, including the earnings variability tests, suggests R&D expenditures reflect information that is value-relevant. However, the information is not as reliable in reflecting future benefits as the information conveyed by expenditures on tangible assets. Several plausible explanations are canvassed. The dominant factor is the role of R&D which relates to future rents rather than current production revenues. Current R&D also includes both value-relevant successful and value-irrelevant unsuccessful

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[17] Green et al. (1996) control variables comprise market share, concentration, debt-to-equity, average industry debt-to-equity, square of the difference between debt-to-equity of firm and industry, and annual variability of stock market returns.

[18] Liu (2007) finds the firm's life-cycle is an omitted variable in commonly used discretionary accrual models, with the inferences from earnings management studies changing once life-cycle is included in the models. Anthony and Ramesh (1992) show that the stock price response to accounting performance measures, sales growth and capital investment is a function of firm life-cycle stage.

expenditures. While the projects are incomplete and success rates are not known, the R&D is not reliable as an indicator of value. It is possible that R&D is also less relevant in some circumstances (e.g. less relevant for established than for growth firms). Hence, evaluating R&D expenditures with probable success rate indicators is important to get insights on relevance, reliability and value. Some information that is relevant to this task includes new drug approvals for pharmaceuticals, more intensive R&D, and growth firms' R&D.

Finally, it is not clear from the evidence to date that reporting the aggregate, R&D expenditures, as a separate line item in the income statement is all that informative about value creation. Outsiders do not know what is included in R&D and whether the inclusions relate directly to future rents. It is possible to identify more informative categories of expenditures for separate line item reporting and as inputs to valuation (Hunter, Webster and Wyatt, 2007).

3.1.4. R&D and IP – input metrics

The firm's production function is conditioned on the state of science and technological knowledge (Jorgenson, 1989). To test the impact of technology as a conditioning factor on the value-relevance of R&D and IP, Greenhalgh and Rogers (2006) condition their analysis on an augmented version of Pavitt's (1984) technology sectors, comprising the following:

1. Supplier-dominated manufacturing and mining: usually smaller firms with weak in-house R&D and engineering capabilities and innovations coming from equipment and materials suppliers;

2. Production- and scale-intensive: large firms producing standard materials or durable goods;

3. Production-intensive, specialised suppliers: machinery and instruments, tending to be smaller technologically specialised firms;

4. Science-based: electronics, electrical and chemicals, usually large firms with in-house R&D-based technology but the basic science is produced elsewhere;

5. Information-intensive: includes finance, retail, communications, publishing, with in-house software or systems development, with purchases of IT hardware and software;

6. Software-related firms: computer software and services.

Using the log of the market value of equity as the dependent variable, Greenhalgh and Rogers find the magnitude of the coefficient on R&D varies substantially across technology sectors. It is lowest for '6. Software' followed by '4. Science' (which spends 45–55% of the total R&D across all six sec-

tors). The highest coefficient is for '2. Production- and scale-intensive' and '5. Information-intensive'. The 'Science' sector result is probably due to the average 20-year lag from an idea to a successful science innovation (Stephan, 1996). Including (total asset deflated) patent and trademark data in the regressions does not affect these coefficients. They find the UK patents are less value-relevant than the European Patent Office patents. Trademarks generally have positive and significant coefficients in each sector. They find the most competitive technological sectors have the lowest market value of R&D. Within the most competitive technology sector (science-based manufacturing), firms with larger market shares (proxying for lower competition) have higher R&D valuations.

Matolcsy and Wyatt (2008) use patent metrics aggregated to the technology sector level (within industries) as technology input metrics, to test whether the association between the market value of equity and current earnings is conditional on the technology conditions. Three technology conditions (within the industry dominating the firms' operations) are considered: the success rate of past technological investments, technology complexity, and the technology development period. Using the market value of equity deflated by sales, they find the technology condition-earnings interactions are value-relevant. The results hold across a range of high-, medium- and low-technology industries consistent with the predicted pervasive effects of technology conditions on the firms' operations. The three technology conditions also predict future earnings, which is a pre-requisite for value-relevance.

In summary, the value-relevance of R&D varies substantially across technology sectors, suggesting technology conditions impact the success rate and hence expected rents from R&D. It is difficult to know whether this is due to variation in value-relevance or reliability, or both of these. Measures of the technological innovation success rate, cycle time, and links to science in a technology sector condition the relations between current earnings and the market value of equity, suggesting the pervasive impact of technology on performance and value.

3.1.5. R&D and IP – output metrics

Patents are output metrics which are used as measures of invention and/or protection arising from IP laws (Lanjouw et al., 1998). The distribution of patents is substantially skewed to low value patents.[19] Researchers also find the rate of decline

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[19] Patent protection is reduced by the capacity of imitators to 'invent around' a patent, by the difficulties actually securing patents on some innovations, and by the problem that patents can disclose information sufficient to facilitate imitators' development of variants of the basic technology; and these problems are typically viewed as greater for process innovations than for product innovations (see Geroski, 1995).

in the value of patents is also much higher than the rate for most physical assets (Cockburn and Griliches, 1988; Schankerman and Pakes, 1986; Pakes, 1986; Schankerman, 1991). Therefore, variation in the use and value of IP renders simple counts of patents not very useful for valuation purposes (Griliches, 1990).

Early studies found patents are value-relevant incrementally to a measure of intangible capital computed from past R&D expenditures (e.g. Griliches, 1981; Pakes, 1985; Cockburn and Griliches, 1988; Megna and Klock, 1993). Greenhalgh and Rogers (2006) find patents are incrementally value-relevant to R&D for UK firms for 1989–2002.

Following the early work using count measures, researchers found *patent renewal* and *patent family size* are useful for computing quality weights for patent count data (Lanjouw et al., 1998). Rather than simply count patents, the patents are partitioned into groups according to the age the patent is allowed to lapse, or by the set of countries in which patent applications were filed. Serrano (2006) also examines the *decision to sell patents* as a measure of value. Bessen (2007) develops and tests a more complex model that gives an upper bound estimate of the value-relevance of patents to the firm. His results are qualitatively similar to the valuation results using the renewal and selling measures. Bessen (2007), among others, finds that chemical and pharmaceutical patents are more valuable than patents in other industries.

Citation analysis is a measurement approach which provides a quality weighting to augment simple count measures of IP (Narin, 2000). High citations to scientific research papers, and from current to prior issued patents, indicate important scientific and technological inventions. For example, a US patent has eight or nine 'References Cited – US patents' on its front page, two references cited to foreign patents, and one to two non-patent references. These references link the patent to the related prior art (related patented invention) and also limit the claims of the current issued patent. Like the patent distribution, the citation distribution is skewed. For example, Narin (2000) reports that for patents issued in 1988, and cited in the next seven years, half the patents are cited two or fewer times, 75% are cited five or fewer times, and only 1% of the patents are cited 24 or more times.

Studies linking citations to the market value of equity find citations to prior patents, and to scientific papers, are value-relevant. For example, Hall, Jaffe and Trajtenberg (2005) find patent citations are incrementally value-relevant over R&D to assets, patents to R&D, and assets, for a sample of companies from 1963 to 1995. They find one additional citation per patent is associated with a 3%

higher stock price, unanticipated citations have a stronger effect on stock price, and citations to the companies' own prior related patents are more valuable than external citations. Hirschey, Richardson and Scholtz (1998) also find patent metrics computed from patent count and citation data are incrementally value-relevant to earnings, book value of shareholders' equity, R&D expenditures and *pro forma* R&D capital.

Another factor to consider is the value implications from the strategic use of IP. Cohen, Nelson and Walsh (2000) provide large sample survey evidence that firms patent for more reasons than direct protection of profits. Firms use patents to prevent rivals from patenting related inventions (e.g. blocking rivals' patents by chemical firms), the use of patents in negotiations (e.g. by telecommunications companies) and the prevention of law suits. Other strategies used with or instead of IP to protect profits from invention include secrecy, lead time advantages, and complementary marketing and manufacturing capabilities. In fact, Cohen et al. find that secrecy and lead time are generally more important than patents for protecting the profits of manufacturing firms.

Schankerman and Noel (2006) investigate the proposition that 'strategic patenting' raises the costs of innovating for rival firms, using two output metrics to proxy for strategic patenting activities: *patent portfolio size*, which they argue affects bargaining power in patent disputes, and the *fragmentation of patent rights*, which increases the costs of enforcement. Consistent with these strategies increasing their own inventive activity and own benefits from invention, they find these metrics are positively associated with innovation activity and with the market value of equity, for a sample of software firms in the period 1980–99.

Henkel and Reitzig (2007) study patent blocking whereby firms patent solely with the intent of blocking other companies' R&D-related innovations. They show that patent blocking is a viable strategy in competitive, higher technology industries, if the 'blockers' focus on inventions that they can easily invent around and where the 'blocking patent infringements' (that the 'blocker' issues against rivals' related patents) are more readily upheld in court.

By contrast, McGahan and Silverman (2006) find, in circumstances where a technological breakthrough creates investment opportunities for all firms in the industry, the positive effects of additional knowledge and opportunities outweighs the negative impact of the patent blocking strategy. Hence, the significance of invention appears to interact with the strategic use of IP to influence performance and firm value.

In summary, patent metrics that are quality weighted, such as using citations to prior patents,

are reliable enough to be value-relevant and are more value-relevant than simple patent counts. It is unclear whether this effect relates to more relevance or reliability or more of both. Output measures of strategic patenting are value-relevant.

3.2. Advertising expenditures, brands, and IP

Brands and trademark (IP) assets are output from prior investments in advertising and expenditures associated with product development and trademark registration. They generate value through market power and signalling of product and, possibly, seller attributes. These assets can be exchanged and operated independently of specific human capital. For example, newspaper businesses with mastheads can be sold and operated independently of the parties who developed the mastheads.

3.2.1. Advertising expenditures, brands, and IP – management reported assets

Prior to the FRS 10 issue in 1998, when brand recognition was allowed in the UK, Muller (1999) finds the UK firms capitalised their brands to meet financial ratio-based rules set by the London Stock Exchange (LSE). These LSE rules waive shareholder approval for acquisitions below certain financial thresholds. For a sample of 33 UK companies for 1988–1996, Muller (1999) reports the firms had previously written off their purchased goodwill, and now with a weak balance sheet, put capitalised brands onto their balance sheets to avoid the costly LSE rules. Hence, the motivation for capitalising the brands is not to communicate with investors, at least, as a first order effect.

Despite this motivation, Kallapur and Kwan (2004) find the goodwill and identifiable intangibles of UK companies, including brands and publishing titles, are reliable enough to be value-relevant. Their firms' median brand assets are a large 44% of the book value of shareholders' equity. However, Kallapur and Kwan provide further evidence suggesting that the value-relevance of the brands was adversely affected by incentives to (1) avoid LSE rules requiring shareholder approval for large acquisition or disposal transactions; and (2) reduce leverage. They conclude the brands are value-relevant but their reliability varies with managements' financial reporting motivations.

In summary, management reported brands prior to 1998 in the UK were reliable enough to be value-relevant. However, the brands were less value-relevant and/or less reliable for firms capi-

talising for agency reasons. It is not clear which of these is descriptive.

3.2.2. Advertising expenditures, brands, and IP – researcher estimated assets

Seethamraju (2000) constructs measures of internally generated US brand names, from the intensity of advertising expense, and finds these estimates are value-relevant. Hence, this evidence suggests brands valued by external parties using publicly available expenditures data are reliable enough to be value-relevant.

3.2.3. Advertising expenditures, brands, and IP – annual advertising expenditures

There is a positive relationship between advertising expenditures and stock price.[20] However, some studies find a significant association only for expenditures on non-durable goods.[21] In tests relating advertising to sales, researchers find advertising is associated with current rather than future sales, which suggests the benefits are short-lived (e.g. Boyer, 1974; Clarke, 1976; Grabowski, 1976; Lambin, 1976). Netter (1982) examines whether firms spend too much on advertising, leading to a weak relation with stock price. He finds the *advertising of competitors* reduces the effectiveness of *non-durable* producers' advertising outlays. Hence, advertising generates value conditional on product type and competition conditions.

The economics of advertising suggests advertising is linked to value creation through the processes of new product development and adoption. As summarised by Nakamura (2005), advertising helps consumers to learn more quickly about the existence and properties of new products, thereby facilitating the flow of benefits and financial rewards from innovation to the producers and consumers. Since new products have increased in economic importance, this suggests the importance of advertising as a continuing long-run investment.

Advertising has another potentially important benefit. These costs are often packaged as a joint product with entertainment, such as free-to-air radio and television. Borden (1942) shows that about half of the total advertising costs in 1937 went to fund entertainment including live artists and leases of phonographs. In relation to the side benefits of advertising, Noll et al. (1973) estimate the value of the rise of television to consumers at about 5.1% of household income in 1969.

What determines the longevity of advertising benefits? Nakamura (2005) suggests longevity is a function of product innovation and adoption. Berndt et al. (1994) provide insights on this issue. They decompose advertising expenditures to separate out *industry-expanding* investment from *rivalry inducing* expenditures. They focus on the

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[20] See, for example, Hirschey (1982), Hirschey and Weygandt (1985), and Chauvin and Hirschey (1993).

[21] See Peles (1970), Abdel-khalik (1975), Ettredge and Bublitz (1988), Bublitz and Ettredge (1989), and Hirschey and Weygandt (1985).

market for ulcer drugs (H2-antagonist drugs: Tagamet, Zantac, Pepcid and Axid). For the rivalry inducing component, they find advertising costs and industry sales are negatively related in circumstances when the number of products on offer in the industry is increasing. Advertising costs under these conditions depreciate at a fast annual rate of 40%. By contrast, the *industry-expanding* component appears to have an almost zero rate of depreciation.

In summary, advertising expenditures are value-relevant in the short term but the evidence is mixed for the long term. It is possible the mixed evidence is due to a lack of value-relevance for companies spending too much on advertising. Alternatively, the mixed evidence could be due to uncertainty about future benefits and hence lack of reliability. It is not clear from the evidence, which is descriptive. Another possibility is gaps in the modelling of the costs and benefits of advertising. In particular, the theory suggests insights on value creation may come from modelling the context of the links between advertising expenditures and market value of equity, focusing on the effects of product innovation and adoption and joint product costs and benefits. These gaps in the literature call for studies of the long-term effects of advertising expenditures, which have been less common to date due to problems obtaining data, along with gaps in our understanding of consumer behaviour (Vakratas and Ambler, 1999).

3.2.4. Advertising expenditures, brands, and IP – input metrics

Franses and Vriens (2004) point out the amount of money companies allocate to advertising often surpasses the companies' after tax profits, but still it is not known whether these investments pay off or not. They argue the reason for this gap is incomplete knowledge about what advertising does in the marketplace and list four factors that are important for understanding the returns to advertising inputs:

1. The process by which advertising affects consumers and leads to brand awareness, brand image, brand consideration, brand choice, and sales;

2. How the effects of advertising are spread out over time;

3. The role of different advertising media (for example, TV versus print advertising), how differentially efficient these vehicles are, how their interaction may lead to synergy effects; and

4. The role and impact of competitive advertising.

These factors suggest the range of input metrics that are relevant to estimates of value creation and longevity of benefits from advertising, for exam-

ple, consumer purchasing, repeat business and switching metrics, firms' advertising strategies, including the frequency and magnitude of efforts, media use metrics, experience and search attributes of products, and the interaction effects with the purpose of advertising (e.g. market share growth, and price premium support).

One area of research having some success in modelling strategy impact on value are studies of optimal scheduling of advertising over time. One example by Dube, Hitsch and Manchanda (2004) is a study of a pulsing strategy in which the firm advertises in sharp, intensive bursts. They develop a dynamic programming framework and find that pulsing is the optimal strategy for the industry sector they study.

Aside from the modelling method employed, the success of the Dube et al. model is due to high-quality input metrics, which contrasts with other studies in this area that use the available, patchy advertising expenditures. The data is Scantrac level scanner data for frozen entrée foodstuff, comprising weekly sales, prices and advertising levels for each brand in 18 cities over 155 weeks. Advertising level is measured using gross rating points rather than dollars, which captures household average exposures to advertising in various markets per week. The long weekly series and the benchmark rating data allows pulse behaviour to be tested (i.e. this is not easy to do with annual or quarterly data and raw dollars). Interestingly, their results suggest continuous advertising is sub-optimal.

In summary, quality input data relating to consumer behaviour and firms' advertising strategies over time are important for measuring and understanding how advertising creates value for the firm. The evidence suggests that it is important to study advertising expenditures in the context of strategy and consumer behaviour to get insights on value creation. An example of such an insight relates to advertising strategy for which there is evidence that continuous advertising rather than a pulsing advertising strategy can destroy value.

3.2.5. Advertising expenditures, brands, and IP – output metrics

Trademarks are intermediate output measures that are potentially valuable when firms use them to signal desirable product attributes to consumers, thereby reducing information asymmetries between sellers and buyers (Landes and Posner, 1987). Trademarks may create value by motivating the firm to invest in quality products (Mendonca, Pereira and Godinho, 2004) and engage in innovation activity and the building of brand value and barriers to entry (Schmalensee, 1978).

Consistent with trademarks generating value, Greenhalgh and Rogers (2006) find trademarks are

incrementally value-relevant to R&D and patents for UK firms for 1989–2002. They find the trademarking firms experience 10–30% higher productivity compared with non-trademarking firms. Further, trademarking activity, and the intensity of trademarking, is associated with larger differences in the market value of equity and productivity among firms in the services industries compared to manufacturing firms.

Barth et al. (1998) test the value-relevance of output measures of brand values from Financial World's (FW) annual brand value surveys.[22] For a sample of 595 US firm-years with brands valued between 1991 and 1996, Barth et al. (1998) find the FW brand values (changes in brand values) are significantly positively associated with the market value of equity (stock returns). The FW brand values are incrementally value-relevant (for market value of equity) to advertising expense, operating margin, growth, market share, recognised brand assets, and analysts' earnings forecasts. The FW sample is not random. It is dominated by large, profitable companies in food and tobacco, chemicals and allied products, rubber, plastic, leather, and glass industries, and under-represented by financial services. Whether brands in general can be valued as successfully is unclear.

In summary, trademarks are value-relevant and appear to be particularly significant value drivers for firms in services industries with a significant but lower impact in manufacturing. The evidence does not distinguish whether this effect relates to lower relevance or reliability, or both. A possible impact of trademarking activity is to motivate the firm to engage in further value-creating product and brand innovations. While this might be motivated by the desire to build the trademark value, there is the potential for feedback effects for the firm's R&D outlays, which may build additional value in the future via the product pipeline and brands. While brands do not have IP rights attached, they are value-relevant for large profitable companies, suggesting they are significant indicators of market power. It is not known whether the independent valuations of brands used by Barth et al. (1998) could be successfully undertaken for firms in general at the same level of reliability.

3.3. Customer loyalty

A number of studies examine whether customer satisfaction measures relating to the firm's product markets are value-relevant. The impetus for this research is marketing studies that propose customer satisfaction is a key value driver because it reflects information about customer retention, price elasticity reduction, brand and reputation effects (Anderson et al., 1994). Further, there is evidence that companies value and track this data (Ross and Georgoff, 1991). There is some overlap between the value represented by brands and customer loyalty assets, although no known studies examine how this might relate to the propensity to create value (e.g. does the interaction between these two constructs generate synergies for the firm?).

3.3.1. Customer loyalty – management reported assets

GAAP standards do not provide for the reporting of customer loyalty assets.

3.3.2. Customer loyalty – researcher estimated asset

A lot of the evidence on the value-relevance of customer loyalty comes from survey-based output metrics produced by researchers, research institutes, or the firms themselves (e.g. Ittner and Larcker, 1998). The evidence from the survey metrics is mixed in part because the survey data is collected by different companies and organisations using different instruments, subjects, and time periods, which makes the results of the studies hard to interpret (Boyd et al., 2004).

By contrast, Gupta et al. (2004) provide evidence on the contribution of customers to value using primarily publicly available information. They provide novel evidence that the long-term value of the firm's customer base is a good proxy for the market value of equity. They first develop a model to value the firm's long-term customer base using the following information: a forecast of customers to be acquired in the future, average customer acquisition costs, profit margin per customer, and customer retention rate. These customer value drivers comprise both financial and non-financial information, some of which are inputs to value (e.g. acquisition costs) and some are outputs to value (e.g. customer retention). Estimates from the customer valuation model are close to the market value of equity for three (Capital One, Ameritrade, E*Trade) of the five firms considered (the measure undervalues Amazon and eBay, which many analysts believed were over-valued at the time).

Consistent with other studies, Gupta et al. (2004) find *customer retention* has the biggest impact on customer value, in the order of 3 to 7% for a 1% increase in retention. By contrast, *profit margin*

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[22] FW reports value estimates, sales, and operating margins for individual brands, by industry, as well as the percentage change in the brand value from the previous year. Brand strength multiples for each brand, obtained from Interbrand, are a weighted metric computed from seven components: (1) Leadership (maximum 25 points); (2) Stability (maximum 15 points); (3) Market (maximum 10 points); (4) Internationality (maximum 25 points); (5) Trend (maximum 10 points); (6) Support (maximum 10 points); and (7) Protection (maximum 5 points).

per customer has a 1% impact on customer value while the *cost of acquiring customers* has a 0.02 to 0.3% effect on value. Further, they find a strong interaction effect between the cost of capital and retention rate. Specifically, the value of customers in the *high retention–low cost of capital* context is 2.5 to 3 times the value in the *low retention–high discount rate* setting. This finding suggests high cost of capital companies would benefit more from customer retention rather than containment of customer acquisition costs.

In summary, issues relating to the reliability of customer loyalty measures are a possible explanation for the mixed value-relevance evidence for measures obtained from survey data. Estimates of the long-term value of the firm's customer base, and the specific drivers of this value (e.g. customer retention), suggest this is an important policy area for firms which warrants further research.

3.3.3. Customer loyalty – annual expenditures

Annual expenditures on customer loyalty are not generally reported as separate line items in GAAP financial statements.

3.3.4. Customer loyalty – input metrics

One input that is a driver of customer loyalty is the quality of customer service. Decreasing levels of customer service have been cited as a cause of competitive decline (Roach, 1991). To provide evidence on the *information content* of the firms' actions to change their quality of customer service, Nayyar (1995) employs an event study. This design has the capacity to indicate whether investors actually used the information, subject to the researcher adequately controlling for competing information. Nayyar argues that if improving customer service leads to improved performance, then actions that improve customer service should be valued positively by the stock market when the actions are announced. Using news reports from business news databases, he identifies actions by firms relating to changes in customer service over 1981–1991. Action (inputs) relate to four customer service objectives: (1) *risk of purchase*; (2) *purchasing cost*; (3) *ease, convenience, cost of use*; and (4) *personalisation*. Nayyar finds that increases (decreases) in customer service are positively (negatively) valued by the stock market, as reflected in cumulative abnormal returns in the event

window. The strongest effects are for *reducing the risk of purchase* (appearance of facilities and guarantees) and *purchasing cost* (customer service outlets, credit terms, computer links to buyers, and operating hours).[23]

Like customer satisfaction, *consumer switching costs* (brand loyalty) give the firm market power over repeat purchasers. These costs make the firm's current market share an important determinant of future profits and value (Klemperer, 2005). Examples of factors that give rise to switching costs include frequent flyer programs, computer component compatibility, and the cost to learn to use another brand.

The effects of consumer switching cost on firm value are ambiguous. Benefits from high customer retention may be off-set if switching costs increase product prices over time to the point where it is viable for consumers to switch brands. Switching costs can discourage new entry to the industry and generate inertia in product and process innovation by reducing the firm's incentives to differentiate their products, thereby reducing competition. The extent of the value created for the firm from consumer switching costs therefore depends on a careful analysis of the competing effects.

In summary, there is evidence that an input to customer loyalty, changes in customer service quality, is associated with cumulative changes in unexpected stock returns. Firms have incentives to create switching costs for consumers to build market share. The challenge for researchers is to define and collect or construct concrete input measures for tracking and studying customer loyalty components.

3.3.5. Customer loyalty – output metrics

Ittner and Larcker (1998) find that a customer satisfaction output metric for a large telecommunications firm (survey of 2,491 from a total of 450,000 customers) is significantly positively and non-linearly associated with customer retention, revenue and revenue-change measures. Tests for business unit customer satisfaction metrics from 73 retail banks (different metric to above) suggest an indirect effect on accounting performance by attracting new customers, consistent with the bank's strategic goal. However, while Ittner and Larcker (1998) find another output metric from the American Customer Satisfaction Index (ACSI) survey is associated with the market value of equity, the relation is not consistent (significant in transport, utility, communication; insignificant in durable and non-durable manufacturing and financial services; significant and negative in retailing). The ACSI metric gives rise to a positive announcement effect (on stock price) suggesting the index conveys information to investors. The index

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[23] As compared with less valuable actions to change the *ease, convenience, and cost of use* (customer service department, technical assistance, toll-free numbers, discretionary comfort features) or the *personalisation of products* (computer to customise products, capacity to meet unique needs). Specific customer service actions viewed most favourably by the stock market are improved guarantees, increased operating hours, greater customer service outlets, and better computer links to buyers.

is also positively significantly associated with forecasted residual earnings, suggesting some of the value is impounded in earnings.

The ACSI is one of the more standardised surveys generating output metrics. It is a national economic indicator managed by the National Quality Research Center and the American Society of Quality. The 15 questions in the survey are organised by four variables: perceived quality, customer expectations, perceived value and customer satisfaction. The customer satisfaction measure is computed from three of the questions relating to overall satisfaction, confirmation of expectations and comparison with the ideal.

Jacobson and Mizik (2007) find the ACSI measure is only value-relevant for computer and internet firms. Jacobson and Mizik (2007) use an annual stock returns specification. The stock returns test looks at relevance in terms of whether this year's change in customer satisfaction is associated with this year's changes in stock price, whereas the stock price levels test does not refer to a narrow time frame. These stock return tests suggest the customer satisfaction measure may not change enough to be value-relevant on an annual changes basis but is value-relevant in a wider time frame. Alternatively, the stock returns test potentially lacks the power to detect value-relevance and/or the ACSI metric is noisy.

Consistent with a forward-looking value creation effect, Banker et al. (2000) find the non-financial measures of customer satisfaction, *likelihood a customer will return to the hotel* and *customer complaints*, are significantly positively and negatively, respectively, associated with future financial performance (business unit revenues and operating profit) for a hotel chain. This data is collected by the hotels. Their evidence suggests that customer satisfaction is related more to long-term rather than short-term performance. Further, they find that changes in management incentive contracts to include these non-financial performance (output) metrics leads to improvements in both financial and non-financial performance.

In summary, precise component level measures of customer loyalty such as in Banker at al. (2000) would help us to understand what drives customer satisfaction in different industries and how to measure the composite output indexes more precisely.

3.4. Competitive advantage

Two literatures relevant to understanding the sources of competitive advantage include the industrial organisation model of competitive advantage focusing on industry (e.g. Porter, 1980; 1985) and the resource-based model of competitive advantage focusing on firm-specific factors (e.g. Wernerfelt, 1984; Barney, 1991; 2001). Studies from these literatures suggest that both firm-specific and industry effects have a role in explaining value creation. However, firm-specific effects dominate industry-specific effects (Rumelt, 1991). According to Barney (1991) value is created from firm-specific endowments when they are valuable, rare, inimitable and difficult to substitute.

Early research focused primarily on financial information to study competitive advantage. However, some researchers believe that the strategic activities that generate (or destroy) value are not formally captured in the traditional categories of financial information. This has motivated researchers to expand their efforts beyond a *financial* focus to study *strategic* sources of competitive advantage. The evidence reviewed in this section suggests that investors refer to a range of GAAP and non-GAAP information relating to the firm's capabilities and strategy to value the firm's stock. This literature identifies a range of competencies that are possible omitted variables from value-relevance studies.

3.4.1. Competitive advantage – management reported assets

Consistent with a greater emphasis on non-financial measures of the firm's intangible value since the mid-1990s, some managers have embraced a broader *strategic focus* on *how* their firm creates value. This involves identifying, measuring and managing the value drivers of customer value, organisational innovation, and shareholder wealth (Ittner and Larcker, 2001). Measurement techniques range from unstructured checklists of diverse financial and non-financial measures to structured methods such as the balanced scorecard, economic value measurement (EVA, residual income or abnormal income), causal business modelling, and environmental uncertainty models.

Proponents of the unstructured checklist of measures argue that using diverse sets of financial and non-financial measures decreases the risk that managers fail to consider relevant dimensions of their firm's performance (Lingle and Schiemann, 1996). Proponents of the structured methods argue that these techniques are useful for identifying successes and failures relating to the firm's strategy and its fit with the organisation's objectives (Simons, 1991; Stewart, 1991; Stern et al., 1995; Gates, 1999; Kaplan and Norton, 1992; 1996; 2001). Structured performance measurement is predicated on the theory that performance measures must be aligned with and contingent on the firm's strategy and value drivers to be useful in promoting value creation (e.g. Langfield-Smith, 1997).

Campbell et al. (2002) test and find evidence consistent with the proposition that the balanced

scorecard technique can be used to identify problems and highlight causes and solutions relating to the firm's operating strategy. However, their analysis, using data from a convenience store chain, suggests that this result only holds if the analysis is conditioned on the firm's competencies (i.e. takes into account the fit between the strategy and the skills of the workforce). Their analysis reveals that a poor fit between strategy and employee capabilities caused the convenience store chain's strategy to be ineffective.

By contrast, Biddle et al. (1997) find traditional accounting measures are more value-relevant than the structured economic value added measures. In the financial services industry, Ittner et al. (2003) find that the structured measurement approaches, the balanced scorecard, economic value measurement, and causal business modelling are associated with higher measurement system satisfaction by users within the firm. But these three approaches are not associated with higher accounting or stock price performance. Instead they find the firms using an unstructured approach, comprising a wide variety of financial and non-financial input and output measures, earn higher stock returns compared with firms with similar strategies or value drivers that do not use the unstructured approach.

In summary, there is mixed evidence on the value-relevance of unstructured and structured methods of measuring value added. It is possible this is partly due to omitted conditioning variables, such as the firm's competencies (Campbell et al., 2002). Another question is how well the methods capture the firm's value-creating processes. Aligned to this is a lack of data on the measures that are actually *used* by managers and purpose or objective of the measures (Ittner and Larcker, 2001). The lack of data is due to the proprietary nature of this type of data, along with the diversity of competencies and strategies in use, which makes it difficult for researchers to obtain robust results.

3.4.2. Competitive advantage – researcher estimated assets

Gjerde et al. (2007) examine the value-relevance of three sources of competitive advantage: *industry-based* competitive advantage and two *firm-specific, resources-based* competitive advantages relating to profitability and risk. Using abnormal stock returns as the valuation variable, and showing consistency with other studies, Gjerde et al. (2007) find the firm-specific advantage is three to four times more value-relevant than the industry specific advantage. Further, they find these two effects are interdependent.

3.4.3. Competitive advantage – annual expenditures

Spending that leads to *information technology (IT) capabilities* has been linked to firm value although with mixed results. Dewan and Min (1997) provide evidence that IT capital is a net substitute for both physical capital and labour in all sectors of the economy using a Computerworld survey of spending by US companies on information systems from 1988 to 1992. Earlier, Brynjolfsson (1993) and Wilson (1993) could not find evidence that IT contributed to firm productivity. Their results were rationalised by higher productivity losing out to lower entry barriers, industry inefficiencies and competition (Hitt and Bryjolfsson, 1996). However, later studies using firm-level data suggest that IT capabilities are related to positive investment returns (Lichtenberg, 1995; Hitt and Brynjolfsson, 1996) and to the stock price-based measures (Bharadwaj et al., 1999; Brynjolfsson et al., 2002). Anderson et al. (2006) employ financial data from the Y2K spending in IT, in contrast to the prior studies, which primarily use survey data. They find opportunistic improvements in the firms' IT capabilities (costs were bundled with the Y2K spending) are associated with higher contemporaneous stock price and higher future profits. What is unclear in this literature is the impact of omitted correlated intangibles, i.e. many sources of intangible value go unrecognised under GAAP.

3.4.4. Competitive advantage – input metrics

Darby et al. (1999) test the value-relevance of the input measure, *ties to star scientists*, for biotechnology firms. Darby et al. (1999) argue that *ties to star scientists* is valued by investors due to the investors' ability to observe related indicators of the firm's intellectual human capital, such as the number of scientists, how many have PhD degrees, where they did their graduate work, and the size of the firm's R&D. They develop a valuation equation based on an option-pricing model that embeds a dynamic jump process. This jump process involves changes in the firm's assets and value whenever the intellectual human capital, in this case the ties to star scientists, generate technological successes. They find that increases in *the ties to star scientists* metric is associated with higher market valuation of the firm but at a decreasing rate. For the average firm (relative to industry), there is a 7.3%, or $16m increase, in the market value of a firm per scholarly article written by, or with, a star scientist compared with a firm with no articles in academic journals.

Amir and Lev (1996) study industry-specific measures of the firms' value drivers for the wireless communications industry. In contrast to other studies, they find the earnings and book value of

shareholders' equity, the two summary measures of the firm's financial performance and position are not value-relevant. However, non-financial input metrics are highly value-relevant for this industry, including a proxy for the firm's expected growth, the *population of potential subscribers*, and a proxy for the firm's expected operating performance, the *penetration ratio of subscribers to the population of potential subscribers*.

Klock and Megna (2000) similarly find that the input metrics, *radio spectrum licenses* and the firm's *potential customer base*, are incrementally value-relevant over advertising and R&D expenditures for firms in the wireless telecommunications industry. In fact, they report that the spectrum license explains over 60% of their market value of equity measure, the Tobin's q. Tobin's q is the market valuation of the firm's financial claims divided by an estimate of the replacement cost of the assets.

Ethiraj et al. (2005) study the sources of competitive advantage for a large Indian software company with about 90% of revenues from exports. Their dataset includes information on revenues, cost, factor inputs, capability measures, various project characteristics, such as size, client industry, and development platform, all measured at the project level. Ethiraj et al. test and find that two sets of firm-specific capabilities are important sources of competitive advantage for firms in the software development industry: *client specific capabilities* and *project management capabilities*. Using non-financial and financial measures, they find that the firms develop these capabilities through learning-by-doing as well as sustained investment. Further, the two types of capabilities contribute heterogeneously to value creation. That is, the two capabilities are present in different proportions across the software firm's projects, cost different amounts of money and provide different levels of benefits. If capabilities such as these interact with investment to impact firm value, then value-relevance tests might need to understand key capabilities to generate valid models.

The value-relevant non-financial information set relating to competitive advantage and future prospects changes over time. Stephan et al. (2007) compare the changing value-relevant information set for firms in the biotechnology industry over two financing windows, 1989–1992 and 1996–2000. In the earlier period, 1989–1992, biotechnology firms going public for the first time (IPOs) comprised IP and research capabilities but few marketable products. The likelihood of success was a function of the number of products in clinical trials, the reputation of underwriters, intel-

lectual property, alliances, and linkages with university-affiliated scientists who won a Nobel Prize.

In the later period – 1996–2000, biotechnology industry was more established, now comprising a large stock of IP, as well as research alliances, and products in clinical testing. Stephan et al. (2007) find the most striking difference between the two time periods relates to the value attached to the firm's association with a Nobel laureate. This value fell from $20.4m in the 1989–1992 period, when there was little other information to signal the firm's prospects, to zero in the later 1996–2000 period.

In summary, the sources of *firm-specific* competitive advantage canvassed in Section 3.4.4 refer to the firm's industry, technology, and business model. This is consistent with the Gjerde et al. (2007) evidence that firm-specific and industry sources of competitive advantage are interdependent. The factors reviewed in this section appear to be robustly value-relevant, consistent with core value driver status. The discussion in this section highlights the importance of identifying core value drivers to ensure that all important sources of value are included in the tests.

3.4.5. Competitive advantage – output metrics

Researchers have studied the contribution of brands to firm value using non-financial output metrics from surveys of customers. While financial measures of brands are usually value-relevant, as discussed earlier, the evidence from these qualitative measures is not so convincing. For example, Mizik and Jacobson (2006) investigate whether five qualitative attributes of brands – *energy, differentiation, relevance, esteem*, and *knowledge* – are value-relevant. Their constructs and measures come from the Young and Rubicam brand survey.[24] Out of the five attributes, only *energy* (future ability to generate benefits) and *relevance* (relevance of the brand to the customer) are value-relevant. Interpreting this study is difficult. For example, it is not clear whether Mizik and Jacobson's lack of results for three of the five brand attributes is due to: (1) problems with the five attributes (e.g. are these really the key factors and are they sufficiently precise to be useful empirically?); (2) problems with the customer responses (e.g. customers have different perceptions of what the 50 questions are asking them); or (3) problems with the way the five attributes are created from the 50 survey questions.

Rajgopal et al. (2003) find competitive advantage output metrics relating to *network advantages* from *website traffic* are incrementally value-relevant over earnings and the book value of shareholders' equity. They provide evidence that the inputs that drive the network advantages are the

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[24] The Young and Rubicam brand asset valuator model is discussed in Fudge (2005).

firm's *affiliate referral program* and *media visibility*. Rajgopal et al. (2003) also find the network advantage is positively associated with financial analysts' one- and two-year ahead earnings forecasts, providing further support for their value-relevance results.

Hand (2000) employs a log-log linear regression, rather than the more common ordinary least squares estimator, to examine the value-relevance of *web traffic* metrics for internet companies incrementally to *economic* variables, including the book value of shareholders' equity, forecasted one-year ahead earnings and forecasted long-run earnings growth (and other supply and demand variables). This type of regression describes a relationship of diminishing returns – i.e. increases in web traffic at low levels (high levels) of web traffic – are associated with large (much smaller) increases in stock price. Hand (2000) finds the economic variables dominate the web traffic output metrics. Only the *number of unique visitors to the firm's website* metric is value-relevant. The metrics that are *not* value-relevant include the *number of page views, hours at the website, and average age and income of visitors*. Hand's (2000) study suggests that econometric issues relating to the dispersion of the data and the function used to model the relations between web traffic metrics, economic data, and firm value can impact the results.

Firm-specific information advantages arising from *networks* have been linked to stock price. Aral and Van Alstyne (2007) argue that the *network* metrics are associated with stock price performance because the networks provide access to novel information. They find evidence consistent with this proposition using output metrics for network advantage, comprising a ten-month panel of email communication patterns, message content, and performance data from a medium-sized executive recruiting firm. They also find an upper limit on network benefits arising from diminishing marginal productivity returns to novel information, consistent with theories of bounded rationality, and cognitive and information overload.

Aral and Weill (2007) provide evidence that the prior mixed results relating to the benefits from *IT capabilities* are due to omitting *strategy* from the analysis. They argue that investments in different IT assets are guided by the firms' strategies (e.g. cost leadership or innovation). That is, the IT assets deliver value along dimensions consistent with the underlying strategy. To provide insights on this hypothesis, they test the association of IT assets, IT capabilities, and strategy inputs, with four dimensions of performance: market valuation, profitability, cost, and innovation. Aral and Weill's (2007) results suggest that the financial investment in IT is not value-relevant. However, the *combina-*

tion of IT investment and IT capabilities drives differences in firm performance and is value-relevant.

In summary, non-financial brand measures of brands appear on the strength of the results in this section to be less reliably measured compared with the financial measures used by Barth et al. (1998) discussed earlier. The studies in this section suggest that other information is important, in addition to the financial information, for understanding the contribution of financial information to performance and value. Further, the non-information interacts with the financial information rather than entering the model additively. For example, not conditioning the IT investment on the firm's IT capabilities and strategy provides an incomplete picture of the value generated by the IT investment and capabilities. Two issues of importance for designing and interpreting value-relevance studies are therefore the heterogeneity of firm-specific capabilities and their interdependence with the firm's strategic choices (Barney, 1991; Rumelt, 1984; Wernerfelt, 1984).

One final issue that relates generally to the competitive advantage literature is the apparent lack of a conceptual framework for the building blocks and purposes of competitive processes. For example, the broad approach (e.g. balanced scorecard) seems more relevant to the purpose of strategy evaluation than to the purpose of firm valuation. This lack of structure may explain the proliferation of studies, targeting a wide range of capabilities and actions, which have been unable to generate robust or generalisable evidence.

3.5. Human capital

Employees create value for the firm by applying their intellectual inputs and manual efforts in the workplace. Human capital assets are heterogeneous and therefore less predictable compared with physical assets. However, investments in labour assets appreciate rather than depreciate with time (Webster, 1999). The incentive that this creates for employers to invest in human capital is mitigated by the employer's inability to own employees and variation in the employees' commitment and reliability. This puts some of the incentives for education and training onto the employee.

There is a view that human capital is increasing in importance as a factor of production because new technologies are now more likely to be embodied in intangibles and labour rather than solely in fixed capital (Kendrick, 1972; Webster, 1999). A number of studies suggest the increasing and often specialised skill set required to participate in some occupations leads to a division (partitioning) of labour into periodic inputs (current expenses) and long-term assets (e.g. Webster, 1998). This trend suggests human capital is important for value

creation, particularly in high-skilled sections. Irrespective of property rights issues relating to human capital, firms requiring skilled labour to compete would be expected to have strong incentives to invest in attraction, retention and motivation of their human capital.

3.5.1. Human capital – management reported assets

Despite anecdotal evidence that a proportion of human capital is an asset, no attempt is made to identify or report these items under GAAP.

There has been a long-running debate on the question of whether to capitalise labour compensation costs as an intangible asset. One suggested approach, similar to capital lease accounting, is to report the discounted present value of estimated compensation costs as a non-current asset and a liability (Lev and Schwartz, 1971). The idea is that a going concern investing in plant, property and equipment commits to future compensation costs for the life of those assets. Expenditures on employees therefore reflect expected benefits and a liability to make continuing payments. This idea has not been adopted, and human capital assets are not reported under GAAP.

3.5.2. Human capital – researcher estimated asset

In a series of papers, Rosett (2001, 2003) provides evidence on the value-relevance, financial policies, and equity risk implications of implementing capitalisation of human capital. Rosett (2001) computes a human capital liability from the present value of expected compensation costs in union labour contracts in the spirit of Lev and Schwartz (1971). In an earlier working paper (Rosett, 1997), he finds the corresponding human capital asset is significantly positively associated with the market value of equity. In Rosett (2001), he finds the increase in leverage from the human capital liability is positively associated with measures of the firm's equity risk. Tests on industry sectors suggest the asset/liability measures are crude for R&D and knowledge intensive industries, where the proportion of value generated from intellectual inputs is greater (i.e. where the partitioning of labour on the basis of skill levels would be greatest).

Rosett (2003) focuses on the equity investment risk and corporate financial policy implication of the firm's liability for the human capital intangible asset. Because labour is costly to adjust in the short run, he argues that the firm has a fixed obligation to pay cash to labour, creating an off-balance-sheet intangible liability similar to a lease. This liability creates a form of financial leverage risk he calls *labour leverage* risk (total employment deflated by the market value of equity) and

labour cost leverage (compensation costs deflated by the market value of equity). He predicts and finds the labour leverage measures are positively correlated with equity investment risk, and negatively correlated with leverage and dividend payout consistent with managers taking human capital risk into account when setting financing and dividend policies.

Lajili and Zeghal (2006) construct *human capital productivity* (marginal product of labour estimated from labour and training expenditures and production function regressions) and an *efficiency indicator* (marginal product of labour minus average industry labour costs) and relate these to stock price performance. Risk-adjusted abnormal returns are computed for portfolios sorted by size, labour-cost disclosure status, and the human capital indicators. They find higher levels of total labour expenditures, workforce productivity, and efficiency is generally associated with higher abnormal returns. Hence, labour costs voluntarily disclosed in financial statements are potentially useful for evaluating human capital assets and value.

Abdel-khalik (2003) constructs a measure of *managerial skills* for executives on the Board of Directors. He employs a latent index regression that comprises a set of *personal variables* (experience, risk preference, and value of owned shares) and a set of *firm-specific* variables (past profit and growth, organisational complexity, and operating risk). The predicted values from the latent variable regression are the measure of *managerial skill*. Abdel-khalik finds these predicted values are value-relevant.

Disclosures relating to managements' stock option incentives are a human capital-related investment that has been tested for value-relevance. For example, Landsman et al. (2004) find the employee stock option (ESO) related costs are value-relevant. However, Landsman et al. (2004) provide evidence which suggests that only one of the four accounting methods for equity-based incentives results in accounting numbers that accurately reflect the dilution effects of ESOs on shareholder value. This method involves the grant date recognition of an asset and a liability and subsequent marking-to-market of the liability. Landsman et al. report that this method is the most value-relevant of the four accounting methods. The other three less value-relevant methods are non-recognition (APB 25), recognition of only the stock option expense (SFAS 123), and recognition of only a stock option asset – as in the FASB's Exposure Draft: Share Based Payment (2004).

Measurement of dilutive effects is an issue. Li and Wong (2004) use a warrant-pricing model to jointly allow for the dilutive and shareholder value impact of employee stock options and use this in equity valuation. They find the market value of eq-

uity is overstated by 6% if the dilutive features of stock options are ignored. A larger bias exists for heavy users of stock options, small firms, and R&D-intensive firms.

In summary, the evidence suggests human capital assets measured using contract and non-financial and financial input data are value-relevant. Managers appear to take the (off-balance sheet) liabilities into account when setting financing and dividend policies, and these liabilities are positively associated with equity risk. Investments in human capital productivity and efficiency are also value-relevant as are measures of managerial skills and their stock option compensation (although the measurement of stock options and dilutive effects is difficult). An area requiring future research is how to more precisely measure human capital assets and liabilities to take skill level into account.

3.5.3. Human capital – annual expenditures

GAAP has a limited role in the reporting of labour costs. Labour costs data is collected by National Statistical Bureaus in their annual surveys. Separate reporting of the *expenditures* paid to employees is envisaged under IAS 1 *Presentation of Financial Statements* (paragraphs 86–95).[25] Despite this expectation, there is no evidence of widespread reporting of labour expenditures under GAAP. Separate reporting of labour expenditures is voluntary in the US. There is a requirement to disclose employee costs and number of employees under the UK Companies Act.[26] Overall, the GAAP data on labour costs appears to be limited.

In the US setting, Ballester et al. (2002) use a more fully specified regression based on Ohlson (1995), compared to Rosett's (1997) working paper discussed above, to examine the proportion of US labour costs that are value-relevant. Separate identification of labour costs in US financial statements is voluntary and they find only about 10% of all US Compustat firms disclose these costs. Of these disclosed costs, only about 16% are value-relevant, with an amortisation rate of 34% per year. Possibly the human capital measures would yield more power in the tests if the labour costs could be disaggregated to separate out higher and lower specificity human capital assets (e.g. skilled/unskilled or partitioning according to scientist/engineer/management/sales).

In the spirit of the earlier discussion on the value

of skilled labour, Hansson (2004) predicts there is a value premium associated with human capital that distinguishes the stock performance of value and glamour stocks. He finds that the *dispersion in wage growth* between value and growth stocks explains a large proportion of the differences in stock returns. The intuition for this result is that the value stocks are less exposed to shocks in rents to human capital. Hansson also finds that differences in the *labour force characteristics* between value and growth stocks are value-relevant.

Despite considerable corporate opposition, and concerns about the reliability of fair value estimates of stock option expense, accounting standards now require corporations to recognise expenses relating to grants of stock options to employees – IFRS 2 *Share-Based Payment* and FASB SFAS 123 (revised 2004). Equity-based compensation is now measured at fair value on grant date, based on the estimated number of awards expected to vest, and allocated as an expense over the vesting period.

Frederickson, Hodge and Pratt (2006) conduct an experiment to study how stock option expense recognition affects the valuation decisions of sophisticated financial statement users. The subjects are 220 business school alumni with an average of 11 years' experience in financial analysis and 16 years' accounting-related work experience. Seventy-nine percent are Certified Public Accountants. An initial *ex ante* reliability assessment by the subjects is updated based on four questions relating to a comparison of *stock option expense* earnings versus *no expense* earnings. Frederickson et al. predict and find (1) users consider stock option expense recognised under a FASB mandate is more reliable than stock option expense voluntarily recognised by management; (2) users consider stock option expense voluntarily recognised on the income statement is more reliable than stock option expense disclosed in the footnotes; and (3) users invest more in a firm that voluntarily recognises stock option expense than in a firm that discloses the expense in the footnotes, even though voluntary recognition reduces reported net income. The results of this study suggest users perceive that stock option grants give rise to expenses and impound this information in firm value accordingly. Further, users behave as if accounting regulation sets the ground rules for credible disclosure, and recognition signals reliability (as opposed to disclosure in the notes).

In summary, human capital measures computed from labour costs are value-relevant. However, researchers find these costs are only very sparsely disclosed and the costs are not sufficiently disaggregated to provide precise measures of the human capital assets. Behavioural research suggests accounting regulation of stock options has created

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[25] Paragraph 91 labels these expenditures 'employee benefits' which are defined in IAS 19 *Employee Benefits* to include all benefits provided to employees in return for employee services.

[26] Thanks to Andy Stark for this information. The UK Company Act where this provision was made can be viewed at http://www.opsi.gov.uk/acts/acts2006/ukpga_20060046_en_1, paragraph 411.

value for firms perceived to be appropriately and transparently applying the standard.

3.5.4. Human capital – input metrics

Colombo and Grilli (2005) study how non-financial input metrics of management quality relate to growth. They examine whether *education* and *prior work experience* are key capabilities of the founders of technology companies that determine differences in the firms' growth. For a sample of 506 young Italian companies in manufacturing and services, they find the years of university education in economic and managerial fields, and to a lesser extent in scientific and technical fields, are positively related to growth but education in other fields is not. Prior work experience in the same industry of the new firm is positively associated with growth while prior work experience in other industries is not. Technical work experience of founders rather than commercial work experience determines growth. There are synergistic gains from having complementary capabilities.

Several studies also report human capital management practices are related to higher firm performance (e.g. Huselid, 1995; Ichniowski et al., 1997; Hitt et al., 2001).

Some industries are largely determined by the firm's endowment of intellectual human capital specific to the dominant technology. One of these is biotechnology (Zucker et al., 1998). Hand (2001) examines whether the human capital reflected in employees is value-relevant for biotechnology companies for whom skilled labour comprising bioscientists and bioengineers is an important factor of production. Because the relevant expenditures on hiring, retaining and incentivising employees are not separately reported under GAAP, Hand (2001) employs proxies of human capital inputs – the total number of employees – and the quality of human capital – the ratio of SGA to the number of employees. It is possible these measures are not precise enough to be value-relevant. For example, the number of employees is commonly used to measure firm size in economic studies. Further, the number of employees includes all workers, not just the biotechnology experts who generate the firm's new science and/or technology. The results are consistent with this conjecture. Using a log-log model, neither of these human capital measures are value-relevant. Hand (2001) reports that the GAAP variables (shareholders' equity, retained earnings, treasury stock, revenues, cost of sales, SGA, R&D, and dividends) explain about 70% of stock price.

In summary, some studies employ non-financial input measures of management skills and find they are associated with differences in firm growth. This is an important area for future research given the lack of GAAP disclosures capable of providing insights on the contribution of human capital investments to value.

3.5.5. Human capital – output metrics

Edmans (2007) finds a non-financial output measure of *employee satisfaction*, the companies' scores from the *Best Companies to Work for in America* ranking, is associated with higher stock price performance. This portfolio of firms also outperformed industry, and characteristics matched benchmarks.

Several studies find that output measures of the *firm's reputation* are value-relevant. The idea is that reputation increases the probability that value-relevant information is impounded into stock price (Healy and Palepu, 1993). For example, Black et al. (1999) find reputation rankings based on Fortune's *America's Most Admired Companies* is positively significantly associated with the difference between the market and book value of equity. Hutton and Stocken (2007) examine the effect of *firm reputation for forecast accuracy* on investors' reaction to managements' earnings forecasts using size-adjusted, three-day event window stock returns centred on the earnings release and management forecast. Their measure of forecasting reputation reflects prior forecast accuracy and frequency. They find that a forecasting reputation makes investors more responsive to management forecast news. A forecasting reputation leads to investors' reaction at the management forecast date largely pre-empting their earnings announcement stock response. However, the results suggest that all firms do not build a forecasting reputation because the cost outweighs the benefits when reported earnings do not reach management's forecast.

Using a field experiment that is co-linked to a laboratory experiment, List (2006) finds subjects drawn from a natural marketplace behave in accordance with social preference models in the laboratory experiments. However, in their naturally occurring market settings, their behaviour better approximates self-interest. List finds the incidences of socially orientated behaviours in the marketplace are motivated by reputation concerns. Fisher and Heinkel (2007) study management's motivation for truth-telling and reputation. In their model, management builds reputation when times are good and honesty is affordable, and exploits reputation in times of need. However, competition appears to constrain this potential managerial agency problem. Relying on the US business combination anti-takeover statutes passed between 1985 and 1991 to measure variation in corporate governance states, Giroud and Mueller (2007) find the loosening of corporate governance constraints is associated with negative operating performance and stock price effects only for firms in less competitive industries. Product market competition

thus appears to act as a brake on managerial agency problems, consistent with the view of Alchian (1950), Friedman (1953) and Stigler (1958) that managerial slack cannot survive in competitive industries.

In summary, output measures of employee satisfaction and firm reputation are correlated with value. Agency conflicts may negatively impact the *ex post* propensity for management to act in accordance with good reputation, although competition may constrain this tendency. An area for future research is input measures of reputation from the previous section, as these are important for understanding the 'causes' of reputation.

3.6. Goodwill

There is a long-lived debate over the conceptual underpinnings of goodwill and indeed whether purchased goodwill is an asset. We have so far encountered a lot of literature in this paper that can provide insights on whether or not a firm has valuable goodwill. It seems much more fruitful to look at the earnings and value implications of specific and identifiable drivers of value.

3.6.1. Goodwill – management reported assets

GAAP-purchased goodwill is the difference between the acquisition price of a business or company and the fair value of the identifiable net assets acquired by the acquiring entity (IFRS 3 *Business Combinations*). Most studies find GAAP goodwill is value-relevant (e.g. Chauvin and Hirschey, 1994; McCarthy and Schneider, 1996; Vincent, 1994; Muller, 1994; Jennings, Robinson, Thompson and Duvall, 1996). Vincent (1994) finds the value-relevance relation holds for up to five years after the acquisition of goodwill.

Chauvin and Hirschey (1994) examine the value-relevance of financial information on intangibles for a sample of US companies in 1989–1991. They find GAAP goodwill, net income, advertising, R&D, intangible assets, and tangible assets are value-relevant for *non-manufacturing* companies. These variables are all value-relevant for *manufacturers*, except for the goodwill and intangible assets, possibly because more of the manufacturers' intangible assets are embodied in plant and equipment (Hansen and Serin, 1997). Goodwill is less value-relevant compared with the other intangible assets, suggesting goodwill is less reliably measured. Muller (1994) also finds evidence consistent with this conclusion.

Amir et al. (1993) and Barth and Clinch (1995) examine the value-relevance of the goodwill adjustment from the reconciliation of UK and Australian GAAP to US GAAP. Both studies find the goodwill adjustment is value-relevant. The UK firms predominantly wrote off all goodwill to shareholders' equity prior to 1996. Hence, the goodwill adjustment is the entire goodwill asset that would have been recorded without the write-off to equity. In a separate analysis for the UK firms, Barth and Clinch (1995) find this goodwill adjustment is value-relevant but less so than the other assets.[27]

Goodwill amortisation is not value-relevant (Amir et al., 1993; Vincent, 1994; Muller, 1994; Jennings et al., 1995; Barth and Clinch, 1995). Clinch (1995) suggests this may reflect a perception that some firms' goodwill is not declining in value. It is also conceivable that the useful life cannot be estimated (by managers or investors) and/or that the Henning et al. (2000) over-valuation component (discussed in Section 3.6.2.) distorts the amortisation charge.

Amortisation is now prohibited under international accounting standards and in other jurisdictions. Chambers (2007) examines whether the change from amortisation of goodwill to an annual impairment test under the US standard, SFAS No. 142 *Goodwill and Intangible Assets*, increased the reliability of goodwill and its value-relevance. He finds the annual impairment testing is associated with an increase in value-relevance. However, information appears to be lost as a result of the elimination of systematic amortisation, which is surprising given most studies find amortisation charges are not value-relevant. Possibly, the impairment loss is understated, and this is an omitted variable being picked up in the tests as a decrease in value-relevance that coincides with the cessation of amortisation.

Consistent with this conjecture, Hayn and Hughes (2006) find goodwill write-offs lag behind the economic impairment of goodwill by an average of three to four years. For one-third of their sample, the delay can extend up to ten years. They find their results for the period prior to the introduction of SFAS No. 142 are also generalisable to the goodwill reported under SFAS No. 142. Ramanna and Watts (2007) corroborate this evidence for a sample of firms with indications of impairment. The frequency of *no goodwill impairment* in their sample is about 71%. The propensity not to impair is associated with financial characteristics that relate to higher management discretion from the unverifiable fair-value measures. The evidence therefore suggests that GAAP goodwill under the impairment test regime is value-relevant but not reliably measured.

In summary, purchased goodwill is value-rele-

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[27] Emmanuel et al. (2004) argue that for models, which disaggregate an accounting measure like book value of equity into separate components, a significant association with stock price does not necessarily mean the market finds the component is value-relevant. The correct test, they argue, compares the coefficients of the component variables and the remaining book value after the decomposition.

vant but less so than tangible assets and does not appear to be reliably measured. This conclusion is consistent with the concepts of relevance and reliability, and their roles in value-relevance tests, as discussed in Section 2.3 and illustrated in Figure 1.

3.6.2. Goodwill – researcher estimated asset

One explanation for the lower value-relevance of goodwill compared with other intangible assets is that it is over-valued on average, on the balance sheet, relative to investor expectations. Consistent with this idea, Henning, Lewis and Shaw (2000) find an over-valuation component which is negatively associated with stock price. They examine the value-relevance of four components of goodwill: (1) write-up of target firm assets to market value; (2) going-concern value of the target; (3) synergy value created by the acquisition; and (4) over-valuation component. Consistent with the conclusion from the previous section that goodwill is not reliably measured, only the first three components are value-relevant, with the going concern component dominating. Arguably, the synergy component is also difficult to value, and its reliability varies.

3.6.3. Goodwill – annual expenditures, input metrics and output metrics

Annual expenditures that relate to the firm's goodwill are not identified under GAAP standards. Measuring unrecorded intangible assets and their implications for firm value was one of the motivations for *investment opportunity set* (IOS) studies. Smith and Watts (1992), Skinner (1993) and Gaver and Gaver (1993) use various proxies for the firms' IOS and report that the IOS helps explain the firms' accounting-based debt, dividend and management compensation policy decisions.

Disaggregating the IOS and identifying and measuring constituent components is necessary to gain further insights, and the literature reviewed in this paper demonstrates the innovative ways that researchers have tackled this problem. Along these lines, Falk and Gordon (1977) proposed that goodwill be defined as the total value of favourable market imperfections and related government regulations, with purchased goodwill representing the amount one firm pays another firm for the sum of these assets. Their empirical work identifies 21 categories of sources of goodwill under four groupings: imperfections in financial markets, labour markets, product markets, and government regulations. For example, labour market imperfections relate to managerial talent, good labour relations, training programs, and organisational structure of the acquired firm. They point out that goodwill is unobservable, and it is therefore easier to think about sources and measures directly.

4. Conclusions and future research

At the 1996 SEC *Symposium on Financial Reporting and Intangible Assets*, Stiglitz (1996) discussed the importance of accounting (and auditing) for the workings of a capitalist society and markets, and the informational limitations of data from the accounting system, in fact data from any measurement system. He noted that while there is going to be a higher uncertainty associated with valuing intangible assets than other assets, it is a source of major distortion to incentive systems to value intangibles at zero (1996: 17–19).

The main thrust of the value-relevance studies reviewed in this paper is consistent with the views expressed by Stiglitz (1996). There is a strong perception permeating the literature that learning about the firm's investments in intangibles is important for understanding how firms create (or destroy) value. This is consistent with the economics of intangible investments as a key input to the production function.

This study compiles a somewhat voluminous review of a wide cross-section of studies on intangibles information. Such a wide-ranging approach is motivated by the difficulty of judging whether value-relevance is due to relevance or reliability and the difficulty of obtaining direct tests of reliability.

4.1. Main findings

Table 1 summarises the main findings from the literature review. The studies are grouped based on the category of intangibles, the measurement approach, and the value-relevance measure: stock price level, stock returns or financial performance. The measurement categories reflect (1) the economics of the value creation processes and the researcher and practitioners' interests in the identification of value drivers and their empirical measures; (2) the influence of GAAP on the reporting of intangibles and the research problems of interest to practitioners and researchers; and (3) the influence of management discretion.

The subtotals show that the literature is concentrated in the *R&D and IP* category. Within this category, the research is concentrated in the *annual R&D outlay* and the *output metrics* measurement areas. The least work in the *R&D and IP* area has been done in the *input metrics* area, for which there is limited data. What goes in R&D is not disclosed; therefore, it is difficult to know what input metrics would be relevant. The *annual outlay* emphasis reflects the effect of GAAP, which requires most R&D to be immediately expensed. The *output metric* emphasis reflects the interest of researchers and practitioners in alternative, non-accounting ways of measuring the success rate of R&D inputs. It is often argued that the success rate information is there in the form of earnings.

However, it is not always feasible to wait until earnings. Further, earnings is an *output* that is not informative about *how* the value was (or is expected to be) created.

Stock price levels studies dominate the *R&D and IP* category. Comparing the significance and totals columns for the *R&D and IP* category, the information on intangibles always has significant coefficients for the stock level studies. For the stock levels tests, the coefficients on the *R&D and IP* category intangibles tend to be larger than the other assets in the regression. This result is not what one would expect to find. This is an issue for future research: to try to design studies that provide insights on the extent to which this result is due to higher value-relevance versus measurement and research design issues (e.g. omitted variables).

The *R&D and IP* stock returns studies are concentrated in the *management reported* and *researcher estimated assets* areas. The estimated coefficients are not always significant for the stock returns studies. One explanation is that the stock returns window, which is typically annual, is not wide enough to capture value-relevant information in the management reported and researcher estimated R&D assets. Both these types of R&D assets are also subject to potentially significant economic uncertainty relating to the success rate. Consistent with this effect, the existing literature indicates that a dollar of R&D is valued differently across time periods, industries and technologies. It would help investors if the causes of this variation could be identified. There are opportunities to study the rate that R&D contributes to value and the cause of changes in the success rate by focusing on stock return windows in which there is a shock, such as a significant invention (e.g. an important drug that trials successfully). Providing systematic evidence on these phenomena will help to distinguish real effects in value-relevance tests from distortions due to research design issues.

For the *brands and advertising* category, the main focus is the *output metrics* which are the more readily available data. Output metrics relate to an important area of value creation, including constructs such as the long-term customer base value and customer retention. There is much less research in the *researcher estimated* assets and *input metrics* areas, presumably because GAAP rules do not require the reporting of brands and advertising. Also, the advertising expenditures might be viewed as proprietary information by managers. In terms of value-relevance metrics, the *stock price levels* studies dominate the *brands and advertising* area and the estimated coefficients on intangibles in these studies are all significant. For the *output metrics* studies, the coefficients on intangibles items tend to be less that the other assets in the tests, but not for the *management reported*

brand and advertising assets, which raises the issue for future research of management reporting incentives and/or research design issues.

For the *customer loyalty* category, *output metrics* dominate. The *output metric* coefficients are all significant and the coefficients tend to be larger than those on the other assets in the regression. This is consistent with the importance of customers to a successful business but could also be due to measurement error or omitted variables. Customer loyalty is an area where there is limited financial accounting data. There is a demand for studies that can provide insights into accounting regulators on the types of financial information relating to customer loyalty that are value-relevant. This type of research requires access to what is currently proprietary financial data. Understanding how customer loyalty is generated and destroyed in different industries is a pre-requisite for identifying value-relevant information on customer loyalty.

For the *competitive advantage* category, there is limited research in the *management reported* and *researcher estimated assets* areas. Not all the coefficients are significant for the *management reported assets* link to *financial performance*. The competitive advantage studies are concentrated in the *annual outlay, input* and *output metrics* categories. But the most work is in the *input metrics* area. The competitive advantage studies are dominated by *stock level* and even more so by *financial performance* studies. The coefficients are all significant and tend to be larger than the coefficients for other assets in the regression. This indicates that either the competitive advantage factors are vitally important or there is measurement error or omitted variables. The competitive advantage literature is one area that would benefit from a general theory that defines and articulates the relevant value constructs, value creation processes and empirical measures. Such a framework is needed to increase the logical validity and reliability of the body of evidence and the generalisability of the results.

The *human capital* category of intangibles has no *management reported assets*, reflecting the impact of GAAP. The stock price studies are spread across the remaining four measurement categories, while the financial performance studies are concentrated in the *input metrics* area. The coefficients are always significant for the human capital information. The coefficients tend to be smaller than other assets in the regression for the *stock levels* but not for the *stock returns* and *financial performance* tests. This result suggests human capital levels *and* changes are both important to firms. The inference is that the human capital contribution to value can change in short time periods. Omitted variables are also a possible cause of the

larger coefficients for the returns and financial performance tests. However, this result is consistent with the theory in this area. There are opportunities to design studies that can help accounting regulators to understand what financial data on human capital is value-relevant. Studies of this type would need access to what is currently proprietary data.

The goodwill section is fully concentrated in the *management reported assets*, reflecting GAAP, and in the *stock level* studies for reasons which are not clear. There are thus opportunities to study stock return and financial performance implications of purchased goodwill. In particular, does purchased goodwill contribute to future performance and when? Is the purchased goodwill relation with stock returns and financial performance changing over time and how rapidly? There are new research opportunities in the goodwill area arising from the major change in GAAP from amortisation to an annual impairment test, particularly arising from the evidence so far that the purchased goodwill balance is overstated on average.

4.2. Evidence on the reliability of financial and non-financial information

The studies reviewed in this paper taken together suggest the expenditures on R&D and purchased goodwill are value-relevant but are not reliable indicators of the future benefits from the investments. For R&D, management knows *what* expenditures are bundled into R&D and how these expenditures are expected to create value (refer to the value construct-to-value creation link in Figure 1). However, this information is not reliably reflected in the R&D measure partly because R&D bundles successful and unsuccessful efforts, and also because GAAP R&D bundles different, *undisclosed* types of expenditures that have different links to the generation of future benefits. For purchased goodwill, the link between the goodwill value construct and value creation is weak (see Figure 1). This lack of definition means that the accounting measure of goodwill cannot be reliable (see Figure 1 and Henning et al., 2000, in Section 3.6.2). Hence, the goodwill measure is relevant but varies in its reliability, a conclusion which is borne out by the empirical evidence (see Section 3.6). The evidence reviewed in this paper indicates that there is little point trying to evaluate the value implications of R&D by focusing only on the number of R&D dollars spent. Section 3.1 refers to a range of factors that are relevant for evaluating R&D. To date, Henning et al. (2000) is the only known study to suggest how to empirically evaluate the value-relevant and reliable components of purchased goodwill.

It is difficult to make categorical statements about the reliability of most of the other informa-

tion items in this paper that researchers have studied. In most cases, differences in value-relevance could be due to differences in relevance, in reliability or differences in both relevance and reliability. What makes it a bit easier to make this judgment for R&D is the triangulation by Healy et al. (2002) and Kothari et al. (2002), using designs that provide an economic benchmark with a *known* value against which the R&D can be evaluated. Further, economic theory indicates that R&D is inherently uncertain, providing a strong *a priori* case for the unreliability of R&D as a predictor of future rents.

Given reliable measurement is important to accounting regulators and those users relying on financial accounting information, designing studies to obtain direct tests of reliability is an important area for future research. One approach is to focus on settings where the value of intangibles is known to be changing and employ stock returns to test for value-relevance. Another area for future research is to identify economic benchmarks other than stock price for the realisability of the expected future benefits from intangibles, and incorporate these benchmarks into the value-relevance tests to provide direct insights on reliability. For example, Healy et al. (2002) simulate a *known* firm value which serves as a value-relevance benchmark. Another example is the Matolcsy and Wyatt (2008) study, which examines the value-relevance of current earnings in the context of three different types of technology conditions that are economic benchmarks for expected growth and property rights effects.

4.3. Research design issues

The studies canvassed in this paper also suggest a range of factors that are potentially omitted variables in value-relevance studies. Further, the financial information links to stock price often vary interactively (and hence non-linearly) with factors such as the firm's resource endowments and strategic choices. In some circumstances, the relation between the information item of interest and stock price is increasing (or decreasing) but at a declining rate, a functional form which may be accommodated by a non-linear function. Non-linearities can arise from life-cycle effects, firm specific effects arising from the specialised nature of each firm's production function, firms reporting losses versus profits, and the differing persistence of earnings components (Das and Lev, 1994; Subramanyam, 1996; Lipe et al., 1998; Call et al., 2007). Thompson et al. (2001), provide an economic justification for using a log-linear form to estimate stock value based on accounting information. These model specification issues can be at least partly addressed if researchers carefully articulate the relevance and reliability links that are

illustrated in Figure 1.

Some empirical measures appear to have a large amount of measurement error (Boyd et al., 2004). Examples include non-financial measures of customer satisfaction, brands and human capital that rely on informal survey data, subjective conceptual frameworks, and potentially imprecise, blunt measures such as the number of employees. Where possible, measuring actual inputs and actual value created is preferable to measuring only the perceptions of these quantities obtained from surveys.

4.4. Trading-off management discretion and regulation

An issue for future research is the costs and benefits of management discretion to voluntarily report intangible assets versus regulation. More financial reporting discretion gives managers the opportunity to report their firm's economic reality. However, agency conflicts can arise between stakeholders and managers. Financial reporting may be overly optimistic or in the worst case scenario, misleading. Further, voluntary reporting without a *standardising reporting framework* for intangibles adversely impacts the interpretability of the resulting information. The adverse effects of *no regulation* is evident from the history of 'intangible capital' reporting which so far has a bewildering range of measures but no conceptual framework or clear purpose(s) of measurement (Hunter et al., 2005). Regulation can have economic consequences if the regulations prevent managers reporting the firm's economic reality (Anderson and Zimmer, 1992). Regulation can provide benefits. For example, there is evidence that investors perceive the regulated stock option compensation reporting is more reliable than the unregulated stock option reporting (Section 3.5.3).

There is evidence from the Australian setting that *management discretion* to report intangible assets is associated with the financial reporting of value-relevant identifiable intangible assets. Acquired and internally generated intangibles (but not basic research) could be reported in the Australian setting until the adoption of IFRS in 2005. The evidence suggests the most discretionary items (the least regulated intangibles) are the most value-relevant, which suggests that discretion is associated with a balance of relevance and reliability (Wyatt, 2005). Wyatt finds that R&D assets and purchased goodwill *are not* value-relevant in this setting, where investors know that managers have discretion to report identifiable intangible assets that are more informative about the source of future benefits.

Contrast these results with the evidence (Section 3.1 and 3.6) that R&D expenditures and purchased goodwill *are* value-relevant in countries where management has limited discretion to report more

precise indicators of future benefits. For example, the expected source of benefits from brands and licences relates to market power and the source of expected benefits from patents and trademarks are monopolies over a specific invention or mark. But how will purchased goodwill benefit the acquirer? Would this goodwill be value-relevant if managers had more accounting discretion to report on intangibles?

What if regulators give firms discretion to report intangible assets on the balance sheet constrained only by the definition and recognition criteria for assets and the statutory audit? The Australian experience prior to the IFRS adoption in 2005 suggests that market efficiency might continue as before. In the Australian setting, the recognised intangible assets that are the least regulated are the assets that are associated with the firms' underlying economic reality (Wyatt, 2005); recognised intangible assets are associated with the generation of future earnings (Ritter and Wells, 2005); financial analyst following is higher, and earnings forecast errors are lower for firms that recognise intangible assets and have growth opportunities but not for the extremely high or low growth opportunities firms (Matolcsy and Wyatt, 2007). This evidence does not suggest that discretion to report intangibles seriously impacts market efficiency.

Does the asymmetric treatment of acquired and internally generated intangible assets achieve the desired aim of increasing the reliability of reported intangibles? The international standard, IAS 38 *Intangible Assets* assumes acquired intangibles are the most relevant and reliable measures due to a market transaction. However, the conceptual discussion summarised in Figure 1 suggests relevance and reliability are determined jointly, not by mode of acquisition, but by the level of definition of the value construct and value creation process, and the ability of the accounting measure to reflect expectations about value creation. This conceptualisation (discussed in Section 2.3) and the empirical evidence (Sections 3.1 and 3.6) suggest the acquired goodwill and the internal R&D are not reliable indicators of future benefits. Reliability is important when payoffs are specified in terms of accounting numbers (e.g. the measure of earnings available for distribution to shareholders as dividends). This is one reason for the pervasiveness of accounting conservatism. What, if any, are the economic consequences of recording these unreliable assets? How much discretion do managers have in applying these asymmetric rules? What affects their judgment in implementing the IAS 38 asymmetric standards?

Some studies suggest *recognition* in the financial statements is a more reliable signal compared with the alternative of *disclosing* in the notes to the accounts (e.g. Ahmed et al., 2006). Consistent with

this idea, external auditors appear to permit more misstatement in footnotes compared with recognised amounts (Libby et al., 2006). There are opportunities to exploit the differences in GAAP across countries to obtain insights on the effects of accounting conservatism, and recognition versus disclosure, on the value-relevance of financial information relating to intangibles.

Barth et al. (2003) find that recognition of a highly unreliable accounting amount, rather than disclosure, increases the information in stock price if the recognised amount is *relevant* information. From Figure 1, when information is *relevant* the manner of value creation is reasonably well defined and the lack of reliability relates to the inability of the measure (e.g. R&D asset) to precisely reflect the expected value creation. Their study suggests that because of the imprecision effects of aggregation (e.g. bundling expenditures to obtain an R&D number) that basing recognition decisions on reliability alone is too simplistic. Reliability relative to relevance is the key, not reliability on its own. The evidence reviewed in this paper is consistent with the Barth et al. (2003) findings in the sense that the information on intangibles is value-relevant in spite of the obvious problems with reliable measurement.

4.5. Regulatory implications

The general problem of incomplete information discussed in Section 2 suggests that more information is better even if it is uncertain. Accounting regulators have gone the other way, increasingly moving to prevent firms measuring and reporting internally generated intangible assets. However, even unreliable numbers can be useful signals that (unobservable) assets exist, pointing investors in the direction of additional relevant information sources. For example, a patent measured and recorded at £1 on the balance sheet is informative if it signals the existence of a patent for which detailed information is publicly available to anyone who cares to search the public patent office online databases.

One gap in financial reporting that is evident from the review in this paper is the reporting of separate line items of expenditures on intangibles in the income statement. The review suggests there are deficiencies in reporting labour expenditures, advertising and marketing, the components of R&D, and expenditures relating to the generation of customer loyalty, IP, and competitive advantage. If all companies were required to disclose broad categories of expenditures on intangibles (more comprehensively than the narrow R&D series), this might level the playing field and alleviate the risk of unilateral information spillovers.

Financial accounting is only one source of information about intangibles. This paper highlights a range of other non-financial sources of information that are value-relevant. This evidence is consistent with Whisenant (1998), who provides evidence that value-relevance is not solely a function of GAAP. Instead, investors use financial statement analysis techniques and recognised data in the annual report, including the notes to the accounts, to adjust the financial statement information before using it in their valuation models. Investors do not expect financial information to stand alone. A question for future research is to what extent the gaps in the financial reporting on intangibles are already addressed by non-financial sources of information.

Finally, an implication of the evidence reviewed in this paper is that accounting regulators might better facilitate value-relevant disclosures on intangibles if they give discretion to management to report their firm's economic reality (as in the Australian experience). To be interpretable, accounting standards are needed as guidance for managers. To be relevant, the standards need to be benchmarked to the economics of the intangible investments so that compliance means the firms report in accordance with their firm's economics (e.g. the technical feasibility test in SFAS No. 86 *Accounting for the Costs of Computer Software to Be Sold, Leased, or Otherwise Marketed*). Research that identifies which of the firms' expenditures create value, and how, is important for assisting regulators to promulgate economically relevant accounting standards.

Regulators can efficiently oversee the exercise of management's financial reporting discretion using an electronic financial reporting surveillance. An example of a reportedly effective system suggested by Bayley and Taylor (2007) uses fairly simple financial statement analysis techniques that pinpoint firms engaged in the management of GAAP financial statements outside an acceptable bound.

References

Abdel-khalik, A. R. (1975). 'Advertising Effectiveness and Accounting Policy'. *The Accounting Review*, October: 657–70.

Abdel-khalik, A. R. (2003). 'Self-Sorting, Incentive Compensation, and Human-Capital Assets'. *European Accounting Review*, 12 (4): 661–697.

Abernathy, W. J. and Clarke, K. B. (1985). 'Innovation: Mapping the Winds of Creative Destruction'. *Research Policy*, 14, 3–22.

Abernethy, M., Bianchi, P., Labory, S., Lev, S., Wyatt, A., Zambon, S. (2003). 'Study on the Measurement and Reporting of Intangible Assets and Associated Reporting Practices', prepared for the Commission of the European Communities – Enterprise Directorate General Contract, contract n. FIF .20010720.

Aboody, D. and Lev, B. (1998). 'The Value Relevance of Intangibles: The Case of Software Capitalisation'. *Journal of Accounting Research*, 36, Supplement:

161–191.

Abramovitz, M. (1993). 'The Search for the Sources of Growth: Areas of Ignorance, Old and New'. *The Journal of Economic History*, 53 (2): 217–243.

Akbar, S. and Stark, A. W. (2003). 'Deflators, Net Shareholder Cash Flows, Dividends, Capital Contributions and Estimated Models of Corporate Valuation'. *Journal of Business Finance & Accounting*, 30 (9–10): 1211–1233.

Accounting Standards Board (1989). SSAP 13 *Accounting for Research and Development*.

Accounting Standards Board (1991). 'The Objective of Financial Statements and the Qualitative Characteristics of Financial Information', Exposure Draft (SP), July.

Accounting Standards Board (1997). FRS10 *Goodwill and Intangible Assets*.

Accounting Standards Board (1999). Statement of Principles.

Accounting Standards Board, Foreningen of Statsautoriserede Revisor, Deutches Recchnungslegungs Standards Committee, Komitet Standardow Rachunkowoci and EFRAG (2007). *Stewardship/Accountability as an Objective of Financial Reporting, Pro-Active Accounting Activities in Europe*.

Agarwal, R. and Gort, M. (2001). First Mover Advantage and the Speed of Competitive Entry, 1887–1986. *Journal of Law and Economics*, 44 (1): 161–177.

Ahmed, A. S., Kilic, E. and Lobo, G. J. (2006). 'Does Recognition versus Disclosure Matter? Evidence from Value-Relevance of Banks' Recognized and Disclosed Derivative Financial Instruments' *The Accounting Review*, 81 (3): 567–588.

Alchian, A. (1950). 'Uncertainty, Evolution, and Economic Theory'. *Journal of Political Economy*, 58: 211–221.

American Accounting Association Financial Accounting Standards Committee (2001). Comment Letter on the FASB proposal 'Disclosure of Information about Intangible Assets'.

American Institute of Certified Public Accountants (AICPA) (2004). http://accounting.rutgers.edu/raw/aicpa/index.htm.

Amir, E., Harris, T. and Venuti, E. (1993). 'A Comparison of the Value-Relevance of U.S. versus Non-U.S. GAAP Accounting Measures Using Form 20-F Reconciliations. *Journal of Accounting Research*, 31: 230–264.

Amir, E., Guan, Y. and Livne, G. (2007). 'The Association of R&D and Capital Expenditures with Subsequent Earnings Variability, Journal of Business'. *Finance & Accounting*, 34 (1 and 2): 222–246.

Amir, E. and Lev, B. (1996). 'Value-Relevance of Nonfinancial Information: The Wireless Communications Industry'. *Journal of Accounting and Economics*, 22: 3–30.

Anderson, E. W., Fornell, W. and Lehmann, D. R. (1994). 'Customer Satisfaction, Market Share and Profitability: Findings from Sweden'. *Journal of Marketing Research*, 58 (3): 53–66.

Anderson, M. C., Banker, R. D., and Ravindran, S. (2006). 'Value Implications of Investments in Information Technology'. *Management Science*, 52 (9): 1359–1376.

Anderson, D. and Zimmer, I. (1992). 'Reactions to Regulation of Accounting for Goodwill'. *Accounting and Finance*, November: 27–50.

Anthony, J. H. and Ramesh, K. (1992). 'Association between Accounting Performance Measures and Stock Prices – A Test of the Life Cycle Hypothesis'. *Journal of Accounting and Economics*, 15 (2–3): 203–227.

Aral, S., and Van Alstyne, M. W. (2007). 'Network Structure and Information Advantage', Working Paper, NYU Stern School of Business; Massachusetts Institute of Technology (MIT) – Sloan School of Management and Boston University – Department of Management Information Systems; MIT – Center for E-Business.

Aral, S. and Weill, P. (2007). 'IT Assets, Organizational Capabilities and Firm Performance: Do Resource Allocations and Organizational Differences Explain Performance Variation?' Working Paper, NYU Stern School of Business and Massachusetts Institute of Technology (MIT) – Sloan School of Management.

Ashton, R. H. (2005). 'Intellectual Capital and Value Creation: A Review'. *Journal of Accounting Literature*, 24: 53–134.

Audretsch, D. (1995). *Innovation and Industry Evolution*, Massachusetts Institute of Technology (MIT), USA.

Austin, D. (1993). 'An Event Study Approach to Measuring Innovative Output: The Case of Biotechnology'. *American Economic Review*, 83: 253–258.

Ball, R. and Brown, P. (1968). 'An Empirical Evaluation of Accounting Income Numbers'. *Journal of Accounting Research*, 6 (2): 159–178.

Ballester, M., Livnat, J. and Seethamraju, C. (1998). 'Individual-Firm Style Loadings, Unrecorded Economic Assets, and Systematic Risk'. *Journal of Accounting, Auditing and Finance*, 13 (3): 275–296.

Ballester, M., Livnat, J. and Sinha, N. (2002). 'Labor Costs and Investments in Human Capital'. *Journal of Accounting, Auditing and Finance*, 17 (4): 351–373.

Banker, R. D., Chang, H. and Majumdar, S. K. (1995). 'The Consequences of Evolving Competition on the Components of Firms' Profits: Recent Evidence from the U.S. Telecommunications Industry'. *Information Economics and Policy*, 7: 37–56.

Banker, R. D., Potter, G. and Srinivasan, D. (2000). 'An Empirical Investigation of an Incentive Plan that Includes Nonfinancial Performance Measures'. *The Accounting Review*, 75 (1): 65–92.

Barney, J. (1991). 'Firm Resources and Sustained Competitive Advantage'. *Journal of Management*, 17: 99–120.

Barney, J. (2001). 'Resource-Based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View'. *Strategic Management Journal*, 27: 643–650.

Barth, M. E., Clement, M. B., Foster, G. and Kasznik, R. (1998). 'Brand Values and Capital Market Valuation'. *Review of Accounting Studies*, 3: 41–68.

Barth, M. and Clinch, G. (1995). 'International accounting differences and their relation to share prices: evidence from U.K., Australian, and Canadian firms', unpublished manuscript.

Barth M. E. and Clinch, G. (1998). 'Revalued Financial, Tangible, and Intangible Assets: Association with Share Prices and Non-Market-Based Value Estimates'. *Journal of Accounting Research*, 36: 199–233.

Barth, M. E., Beaver, W. H. and Landsman, W. R. (2001). 'The Relevance of the Value Relevance Literature for Financial Accounting Standard Setting: Another View'. Working Paper, Stanford University.

Barth, M. E., Clinch, G. and Shibano, T. (2003). 'Market Effects of Recognition and Disclosure'. *Journal of Accounting Research*, 41 (4): 581–609.

Bayley, L. and Taylor, S. L., 2007. 'Identifying Earnings Overstatements: A Practical Test'. Working Paper, University of New South Wales.

Ben Zion, U. (1978). 'The Investment Aspect of Nonproduction Expenditures: An Empirical Test'. *Journal of Economics and Business*, (Spring–Summer):

224–229.

Ben Zion, U. (1984). 'The R&D and Investment Decision and Its Relationship to the Firm's Market Value: Some Preliminary Results', in: Z. Griliches (ed.), *R&D Patents and Productivity*. Chicago, IL: University of Chicago Press.

Berndt, E., Bui, L. T., Reiley, D. and Urban, G. L. (1994). 'The Roles of Marketing, Product, Quality and Price Competition in the Growth and Composition of the U.S. Anti-Ulcer Drug Industry'. NBER Working Paper No. W4904.

Bernstein, J. I. and Nadiri, M. I. (1982). 'Financing and Investment in Plant and Equipment and Research and Development'. NBER Working Paper No. W1017.

Bessen, J. E. (2006). 'Estimates of Firms' Patent Rents from Firm Market Value'. Working Paper, Boston University School of Law.

Bharadwaj, A. S., Bharadwaj, S. G. and Konsynski, B. R. (1999). 'Information Technology Effects on Firm Performance as Measured by Tobin's q'. *Management Science*, 45 (7): 1008–1024.

Biddle, G., Bowen, R. and Wallace, J. (1997). 'Does EVA® Beat Earnings? Evidence on the Associations with Stock Returns and Firm Values'. *Journal of Accounting and Economics*, 24: 301–336.

Black, E., L., Carnes, T. A. and Richardson, V. J. (1999). 'The Market Valuation of Firm Reputation'. Working Paper, Brigham Young University, Berry College and University of Arkansas at Fayetteville.

Boone, J. P. and Raman, K. K. (2001). 'Off-Balance Sheet R&D Assets and Market Liquidity'. *Journal of Accounting and Public Policy*, 20 (2): 97–128.

Borden, N. (1942). *The Economic Effects of Advertising*, Chicago, Irwin.

Boyd, B. K., Gove, S. and Hitt, M. A. (2005). 'Construct Measurement in Strategic Management Research: Illusion or Reality?'. *Strategic Management Journal*, 26 (3): 239–257.

Boyer, K. D. (1974). 'Informative and Goodwill Advertising'. *The Review of Economics and Statistics*, 56 (4): 541–548.

Brynjolfsson, E. (1993). 'The Productivity Paradox of Information Technology', *Communications of the ACM*, 36 (12): 66–77.

Brynjolfsson, E., Hitt, L. and Yang, S. (2002). 'Intangible Assets: Computers and Organizational Capital'. *Brookings Papers on Economic Activity*, 1: 137–199.

Bublitz, B. and Ettredge, M. (1989). 'The Information in Discretionary Outlays: Advertising, Research, and Development'. *The Accounting Review*, 64 (1): 108–124.

Call, A. C., Hewitt, M. and Shevlin, T. (2007), 'Investors' Mispricing of Earnings: A Model of Persistence and the Stock Price Consequences'. Working Paper, University of Washington.

Campbell, D., Datar, S., Kulp, S. C. and Narayanan, V. G. (2002). *Using the Balanced Scorecard as a Control System for Monitoring and Revising Corporate Strategy*, Harvard Business School and George Washington University.

Cantwell, J. (1989). *Technological Innovation and Multinational Corporations*. Oxford: Basil Blackwell.

Caves, R. (1982). *Multinational Enterprise and Economic Analysis*. New York, NY: Cambridge University Press.

Caves, R. E. and Murphy, W. F. (1976). 'Franchising: Firms, Markets, and Intangible Assets', *Southern Economic Journal*, 42 (4): 572–586.

Ceccagnoli, M., Arora, A., Cohen, W. and Vogt, W. (1998). 'R&D, Knowledge Spillovers, and Competition among Firms with Asymmetric Technological Capabilities'.

Working Paper, Carnegie Mellon University.

Chambers, D. J. (2007). 'Has Goodwill Accounting under SFAS 142 Improved Financial Reporting?'. Working Paper, University of Kentucky.

Chambers, D. J., Jennings, R. and Thompson, R. B. (2002). 'Excess Returns to R&D-Intensive Firms'. *Review of Accounting Studies*, 7 (2–3), 133–158.

Chan, S-H. Martin, J. and Kensinger, J. (1990). 'Corporate Research and Development Expenditures and Share Value'. *Journal of Financial Economics*, 26: 255–276.

Chauvin, K. W. and Hirschey, M. (1993). 'Advertising, R&D Expenditures and the Market Value of the Firm'. *Financial Management*, 22: 128–140.

Chauvin, K. W. and Hirschey, M. (1994). 'Goodwill, Profitability, and the Market Value of the Firm'. *Journal of Accounting and Public Policy*, 13: 159–180.

Cheng, Q. (2005). 'What Determines Residual Income?'. *The Accounting Review*, 80 (1), 85–112.

Cheng, A., Hopwood, W. S. and McKeown, J. C. (1992). 'Non-Linearity and Specification Problems in Unexpected Earnings Response Regression Model'. *The Accounting Review*, 67 (3): 579–598.

Clarke, D.G. (1976). 'Econometric Measurement of the Duration of Advertising Effects on Sales'. *Journal of Marketing*, 13 (4): 345–357.

Clinch, G. (1995). 'Capital markets research and the goodwill debate'. *Australian Accounting Review* 5: 22–30.

Cockburn, I. and Griliches, Z. (1988). 'Industry Effects and Appropriability Measures in the Stock Market's Valuation of R&D and Patents'. *American Economic Review*, 78 (2): 419–423.

Cohen, W. (1995). 'Empirical Studies of Innovative Activity', in P. Stoneman (ed.), *Handbook of the Economics Of Innovation and Technological Change*. Cambridge, Massachusetts: Basil Blackwell Ltd.

Cohen, W. M., and Klepper, S. (1992). 'The Anatomy of Industry R&D Intensity Distributions'. *American Economic Review*, 82: 773–788.

Cohen, W. M. and Levinthal, D. A. (1989). 'Innovation and Learning: The Two Faces of R&D – Implications for the Analysis of R&D Investment'. *Economic Journal*, 99: 569–596.

Cohen, W. M., Nelson, R. R. and Walsh, J. P. (2000). 'Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (Or Not)'. NBER Working Paper 7552, Cambridge, Massachusetts.

Colombo, M. G. and Grilli, L. (2006). 'Founders' Human Capital and the Growth of New Technology-Based Firms: A Competence-Based View'. *Research Policy*, 34 (6): 795–816.

Connolly, R. A., Hirsch, B. T. and Hirschey, M. (1986). 'Union Rent Seeking, Intangible Capital, and Market Value of the Firm'. *The Review of Economics and Statistics*, 68 (4): 567–577.

Connolly, R.A. and Hirschey, M. (1990). 'Firm Size and R&D Effectiveness: A Value-Based Test'. *Economics Letters*, 32 (3): 277–281.

Darby, M. R., Liu, Q. and Zucker, L. G. (1999). 'Stakes and Stars: The Effect of Intellectual Human Capital on the Level and Variability of High-Tech Firms' Market Values'. NBER Working Paper No. W7201.

Das, S. and Lev, B. (1994). 'Nonlinearity in the Returns-Earnings Relation: Tests of Alternative Specifications and Explanations'. *Contemporary Accounting Research*, 11: 353–379.

Deng, Z. and Lev, B. (1998). 'The Valuation of Acquired R&D'. Working Paper, Stern School of Business, New York University.

Dewan, S. and Min, C. (1997). 'The Substitution of Information Technology for Other Factors of Production: A Firm Level Analysis'. *Management Science*, 43 (12): 1660–1675.

Dosi, G. (1988). 'Sources, Procedures and Microeconomic Effects of Innovation'. *Journal of Economic Literature*, 36: 1126–1171.

Dube, J., Hitsch, G. J. and Manchanda, P. (2004). 'An Empirical Model of Advertising Dynamics'. Working Paper, University of Chicago.

Edmans, A. (2007). 'Does the Stock Market Fully Value Intangibles? Employee Satisfaction and Equity Prices'. Working Paper, University of Pennsylvania.

Ely, K. and Waymire, G. (1999). 'Intangible Assets and Stock Prices in the Pre-SEC Era'. *Journal of Accounting Research*, 37, Studies on Credible Financial Reporting: 17–44.

Emanuel, D., Wong, N. and Hunt, A. (2004). *Testing for a Cross-Sectional Relationship Between Market and Accounting Numbers*, University of Auckland and Charles River Associates.

Ethiraj, S. E., Kale, P., Krishnan, M. S. and Singh, J. (2005). 'Where Do Capabilities Come from and How Do They Matter? A Study in the Software Services Industry'. *Strategic Management Journal*, 26: 25–45.

Ettredge, M. and Bublitz, B. (1988). 'A Reexamination of Market-Assessed Intangible Assets: Advertising and R&D'. Working Paper, Washington State University and University of Kansas.

Falk, H., and Gordon, L. (1977). 'Imperfect Markets and the Nature of Goodwill', *Journal of Business Finance and Accounting*, 4 (4):, 443–462.

Financial Accounting Standards Board (1972). Accounting Principles Board Opinion No. 25, *Accounting for Stock Issued to Employees*.

Financial Accounting Standards Board (1974). Statement of Financial Accounting Standards 2, *Accounting for Research and Development Costs*.

Financial Accounting Standards Board (1985). Statement of Financial Accounting Standards 86, *Accounting for the Costs of Computer Software to Be Sold, Leased or Otherwise Marketed*.

Financial Accounting Standards Board (1995). Statement of Financial Accounting Standards 123, *Accounting for Stock-Based Compensation*.

Financial Accounting Standards Board (2001). *Proposal for a New Agenda Project: Disclosure of Information about Intangible Assets Not Recognized in Financial Statements*, 17 August.

Financial Accounting Standards Board (2001). Statement of Financial Accounting Standards 142, *Goodwill and Other Intangible Assets*.

Financial Accounting Standards Board (2004). Statement of Financial Accounting Standards 123, *Share-Based Payment*.

Financial Accounting Standards Board (2004), Exposure Draft, Share Based Payment. FASB, Norwalk, CT.

Fisher, I. (1930). *The Theory of Interest*. New York, NY: Macmillan.

Fisher, A. J. and Heinkel, R. L. (2007). *Reputation and Managerial Truth-Telling as Self-Insurance*, University of British Columbia.

Ford, J. L. (1994). *G.L.S. Shackle: The Dissenting Economist's Economist*, Edward Elgar, Aldershot.

Franses, P. H. and Vriens, M. (2004). 'Advertising Effects on Awareness, Consideration and Brand Choice Using Tracking Data'. Working Paper, Erasmus Research Institute of Management, Erasmus University of Rotterdam.

Frederickson, J., Hodge, F. and Pratt, J. (2006). 'The Evolution of Stock Option Accounting: Disclosure, Voluntary Recognition, Mandated Recognition and Management Disavowals'. Working Paper, Melbourne Business School, University of Washington, Indiana University, Bloomington.

Freeman, R. N. and Tse, S. Y. (1992). 'A Nonlinear Model of Security Price Responses to Unexpected Earnings'. *Journal of Accounting Research*, 30 (2): 185–209.

Friedman, M. (1953). *The Methodology of Positive Economic, in Essays on Positive Economics*. Chicago: University of Chicago Press.

Fudge, A. (2005). 'Brand Energy: A Compass for Navigating Troubled Waters'. Marketing Science Institute Conference on Connecting with Customers in a Complex World.

Gates, S. (1999). *Aligning Strategic Performance Measures and Results*. New York, NY: The Conference Board.

Gaver, J., and Gaver, M. (1993). 'Additional Evidence on the Association Between the Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies'. *Journal of Accounting and Economics*, 16: 125–160.

Geroski, P. A. (1995). Chapter 4 'Markets for technology: knowledge, innovation and appropriability', in: P. Stoneman, (ed.), *Handbook of the economics of innovation and technological change*. Great Britain: Blackwell Publishers Ltd: 90–131.

Geroski, P. A. (2000). 'Models of Technology Diffusion'. *Research Policy*, 29: 603–625.

Giroud, X. and Mueller, H. M. (2007). 'Does Corporate Governance Matter in Competitive Industries?'. Working Paper, New York University.

Givoly, D. and Shi, C. (2007). 'Accounting for Software Development Costs and the Cost of Capital: Evidence from IPO Underpricing in the Software Industry'. Working Paper, Pennsylvania State University and University of California, Irvine.

Gjerde, O., Knivsfla, K. and Saettem, F. (2007). 'Evidence on Competitive Advantage and Superior Stock Market Performance'. Working Paper, Norwegian School of Economics and Business Administration.

Grabowski, H. G. (1976). 'The Effect of Advertising on the Interindustry Distribution of Demand'. *Explorations in Economic Research*, 3: 21–75.

Grabowski, H. G., and Mueller, D. C. (1978). 'Industrial Research and Development, Intangible Capital Stocks, and Firm Profit Rates'. *The Bell Journal of Economics*: 328–342.

Graves, S. B. (1989). 'Why Costs Increase When Projects Accelerate'. *Research Technology Management*, 32 (2): 16–18.

Green, J. P., Stark, A. W. and Thomas, H. M. (1996). 'UK Evidence on the Market Valuation of Research and Development Expenditures'. *Journal of Business Finance and Accounting*, 23 (2): 191–216.

Greenhalgh, C. and Rogers, M. (2006). 'The Value of Innovation: The Interaction of Competition, R&D and IP'. *Research Policy*, 35: 562–580.

Griliches, Z. (1981). 'Market Value, R&D, and Patents'. *Economic Letters*, 7: 183–187.

Griliches, Z. (1990), 'Patent Statistics as Economic Indicators: A Survey'. *Journal of Economic Literature*, 28: 1661–1707.

Griliches, Z. (1994). 'Productivity, R&D, and the Data Constraint, Presidential Address delivered at the one-hundred sixth meeting of the American Economic Association', *The American Economic Review*, 84, 1, 1–23.

Griliches, Z., Hall, B. H. and Pakes, A. (1991). 'R&D, Patents, and Market Value Revisited: Is There Evidence of A Second Technological Opportunity Related Factor?'. NBER Working Paper 2624, National Bureau of Economic Research.

Griliches, Z., Pakes, A. and Hall, B. (1987). 'The Value of Patents as Indicators of Inventive Activity', in P. Dasgupta and P. Stoneman (eds.), *Economic Policy and Technological Performance*. Cambridge: Cambridge University Press.

Guay, W. and Verrecchia, R. E. (2007). 'Conservative Disclosure'. Working Paper, The Wharton School, University of Pennsylvania.

Gupta, S., Lehman, D. R. and Stuart, J. A. (2004). 'Valuing Customers'. *Journal of Marketing Research*, XLI, February: 7–18.

Hall, B. (2000). 'Innovation and Market Value', in Barrell, R., G. Mason and M. O'Mahoney (eds.), *Productivity, Innovation and Economic Performance*. Cambridge UK: Cambridge University Press.

Hall, B. H. (1991). 'The Impact of Corporate Restructuring on Industrial Research and Development'. NBER Working Paper No. W3216.

Hall, B. H. (1993a). 'The Stock Market's Valuation of R&D Investment During the 1980s'. *American Economic Review*, 83 (2): 259–264.

Hall, B. H. (1993b). 'Industrial Research During the 1980s: Did the Rate of Return Fall?'. *Brookings Papers on Economic Activity: Microeconomics*, 2: 289–393.

Hall, B. H. and Kim, D. (1999) *Valuing Intangible Assets: the Stock Market Value of R&D Revisited*. UC Berkeley, Harvard University, and NBER.

Hall, B. H., Jaffe, A. B. and Trajtenberg, M. (2001). 'The NBER Patent Citation Data File: Lessons, Insights and Methodological Tools. NBER Working Paper No. 8498.

Hall, B. H., Jaffe, A., and Trajtenberg, M. (2005). 'Market Value and Patent Citations'. *RAND Journal of Economics*, 36 (1): 16–38.

Hand, J. (2000). 'The Role of Economic Fundamentals, Web Traffic, and Supply and Demand in the Pricing of U.S. Internet Stocks'. Working Paper, University of North Carolina at Chapel Hill.

Hand, J. (2001). 'The Market Valuation of Biotechnology Firms and Biotechnology R&D'. Working Paper, University of North Carolina at Chapel Hill.

Hand, J. (2003). 'The Value Relevance of Financial Statements in Private Equity Markets'. Working Paper, University of North Carolina at Chapel Hill.

Hansen, P. A., and Serin, G. (1997). 'Will Low Technology Products Disappear? The Hidden Innovation Processes in Low Technology Industries'. *Technological Forecasting and Social Change*, 55: 179–191.

Hansson, B. (2004). 'Human Capital and Stock Returns: Is the Value Premium an Approximation for Return on Human Capital?'. *Journal of Business, Finance and Accounting*, 31 (3–4): 333–358.

Hayek, F. A. (1945). 'The Use of Knowledge in Society'. *The American Economic Review*, XXXV (4): 519–530.

Hayn, C. and Hughes, P. J. (2006). 'Leading Indicators of Goodwill Impairment'. *Journal of Accounting, Auditing, and Finance*, 21 (3): 223–265.

Healy, P. M. and Palepu, K. G. (1993). 'The Effect of Firms' Financial Disclosure Strategies on Stock Prices'. *Accounting Horizons*, 7: 1–11.

Healy, P. M., Myers, S. C. and Howe, C. (2002). 'R&D Accounting and the Tradeoff Between Relevance and Objectivity'. *Journal of Accounting Research*, 40 (3): 677–710.

Henkel, J., and Reitzig, M. (2007). 'Patent Sharks and the Sustainability of Value Destruction Strategies'. Working Paper, Munich University of Technology, Faculty of Economics and Business Administration, and London Business School.

Henning, S. L., Lewis, B. L., and Shaw, W. H. (2000). 'Valuation of the Components of Purchased Goodwill'. *Journal of Accounting Research*, 38 (2): 375–386.

Hirschey, M. (1982). 'Intangible Capital Aspects of Advertising and R&D Expenditures'. *Journal of Industrial Economics*, 4: 375–389.

Hirschey, M., Richardson, J., and Scholtz, S. (1998). 'Value Relevance of Nonfinancial Information: The Case of Patent Data'. University of Arkansas and University of Kansas.

Hirschey, M., and Weygandt, J. J. (1985). 'Amortisation Policy for Advertising and Research and Development'. *Journal of Accounting Research*, 23: 326–335.

Hitt, L. M., and Brynjolfsson, E. (1996). 'Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value'. *MIS Quarterly*, 20 (2): 121–142.

Hitt, M. A., Bierman, L., Shimizu, K., and Kochhar, R. (2001). 'Direct and Moderating Effects of Human Capital on Strategy and Performance in Professional Service Firms. A Resource Based Perspective'. *Academy of Management Journal*, 44: 13–28.

Holthausen, R., and Watts, R. (2001). 'The Relevance of the Value relevance Literature for Financial Accounting Standard Setting'. *Journal of Accounting and Economics*, 31: 3–75.

Hunter, L. C., Webster, E., and Wyatt, A. (2005). 'Techniques for Measuring Intangible Capital: A Review of Current Practice'. *The Australian Accounting Review*, 15 (36): 4–21.

Hunter, L. C., Webster, E., and Wyatt, A. (2007). 'An Accounting Approach to Estimating the Return on Intangible Investments'. Working Paper, University of Technology, Sydney and the Intellectual Property Research Institute of Australia, University of Melbourne.

Huselid, M. A. (1995). 'The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance', *Academy of Management Journal*, 38: 635–672.

Hutton, A., and Stocken, P. (2007). 'Effect of Reputation on the Credibility of Management Forecasts'. Working Paper, Boston College and Dartmouth College.

Ichniowski, C., Shaw, K. and Prennushi, G. (1997). 'The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines'. *The American Economic Review*, 87: 291–313.

International Accounting Standards Board (2004) (revised). IAS 19 *Accounting for Retirement Benefits in Financial Statements of Employers*.

International Accounting Standards Board (2004) (revised). IAS 38 *Intangible Assets*.

International Accounting Standards Board (2004). IFRS 2 *Share-Based Payment*.

International Accounting Standards Board (2004). IFRS 3 *Business Combinations*.

International Accounting Standards Board (2007) (revised). IAS 1 *Presentation of Financial Statements*.

Ittner, C. D. and Larcker, D. F. (1997). 'Product Development Cycle Time and Organizational Performance'. *Journal of Marketing Research*, XXXIV: 13–23.

Ittner, C. D. and Larcker, D. F. (1998). 'Are Non-Financial Measures Leading Indicators of Financial Performance? An Analysis of Customer Satisfaction'. *Journal of Accounting Research*, 36, Supplement: 1–46.

Ittner, C. D. and Larcker, D. F. (2001). 'Assessing Empirical Research in Managerial Accounting: A Value-Based Management Perspective'. *Journal of Accounting and Economics*, 32 (1–3): 349–410.

Ittner, C. D., Larcker, D. F. and Randall, T. (2003). 'Performance Implications of Strategic Performance Measurement in Financial Services Firms'. *Accounting, Organizations and Society*, 28: 715–741.

Jacobson, R., and Mizik, N. (2007). 'The Financial Markets and Customer Satisfaction: Re-examining the Value Relevance of Customer Satisfaction from the Efficient Markets Perspective'. Working Paper, University of Washington and Columbia University.

Jaffe, A.B. (1986). 'Technological Opportunity and Spillovers of R&D: Evidence from Firms' Patents, Profits, and Market Value'. *American Economic Review*, 76 (5): 984–1,001.

Jennings, R., Robinson, J., Thompson, R. and Duvall, L. (1996). 'The Relationship between Accounting Goodwill Numbers and Equity Values'. *Journal of Business Finance and Accounting*, 23 (4): 513–533.

Johnson, L. D., and Pazderka, B. (1993). 'Firm Value and Investment in R&D'. *Journal of Managerial and Decision Economics*, 14 (1): 15–24.

Jorgenson, D. (1989). 'Production Functions', in *The New Palgrave – A Dictionary of Economics*, J. Eatwell, M. Milgate, and P. Newman (eds.). United Kingdom: The Macmillan Press Limited: 1002–1007.

Kallapur, S. and Kwan, S. (2004). 'The Value Relevance and Reliability of Brand Assets Recognized by U.K. Firms'. *The Accounting Review*, 78 (1): 151–172.

Kaplan, R. and Norton, D. (1992). 'The Balanced Scorecard: Measures that Drive Performance'. *Harvard Business Review*, 70 (1): 71–80.

Kaplan, R. and Norton, D. (1996). *The Balanced Scorecard: Translating Strategy into Action*. Boston, MA: Harvard Business School Press.

Kaplan, R. and Norton, D. (2001). *The Strategy Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment*. Boston, MA: Harvard Business School Press.

Kendrick, J. (1972). 'The Treatment of Intangible Resources as Capital'. *Review of Income and Wealth*, 18 (1): 109–125.

Klemperer, P. (2005). 'Competition When Consumers have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomic, and International Trade'. *Review of Economics Studies*, 62: 515–539.

Klock, M. and Megna, P. (2000). 'Measuring and Valuing Intangible Capital in the Wireless Communications Industry'. *The Quarterly Review of Economics and Finance*, 40: 519–532.

Knight, F. (1921). *Risk, Uncertainty, and Profit*. Chicago, IL: University of Chicago Press.

Kothari, S. P., Laguerre, T. E. and Leone, A. J. (2002). 'Capitalization versus Expensing: Evidence on the Uncertainty of Future Earnings from Capital Expenditures versus R&D Outlays'. *Review of Accounting Studies*, 7 (4): 355–382.

Kothari, S. P., Shu, S., and Wysocki, P. (2007). 'Do Managers Withhold Bad News?'. Working Paper, Massachusetts Institute of Technology.

Kwon, S. (2001). 'Value Relevance of Financial Information and Conservatism: High-Tech versus Low-Tech Stocks'. Working Paper, Rutgers Business School, Camden.

Lach, S. and Rob, R. (1996). 'R&D, Investment, and Industry Dynamics'. *Journal of Economics and Management Strategy*, 5 (2): 217–249.

Lach, S. and Schankerman, M. (1989). 'Dynamics of R&D and Investment in the Scientific Sector'. *Journal of Political Economy*, 97 (4): 880–904.

Lajili, K., and Zéghal, D. (2006). 'Market Performance Impacts of Human Capital Disclosures'. *Journal of Accounting and Public Policy*, 25 (2): 171–194.

Lambin, Jean J. (1976). 'Advertising, Competition and Market Conduct in Oligopoly Over Time'. Amsterdam: North Holland Publishing Co.

Landes, W. M., and Posner, R. A. (1987). 'Trademark law: An economic perspective'. *Journal of Law and Economics*, 30 (2): 265–309.

Landsman, W. R., Peasnell, K., Pope, P. and Yeh, S. (2004). 'The Value Relevance of Alternative Methods of Accounting for Employee Stock Options'. Working Paper, University of North Carolina at Chapel Hill, Lancaster University and National Taiwan University.

Langfield-Smith, K. (1997). 'Management Control Systems and Strategy: A Critical Review'. *Accounting, Organizations and Society*, 22 (2): 207–232.

Lanjouw, J. O., Pakes, A. and Putnam, J. (1998). 'How to Count Patents and Value Intellectual Property: The Uses of Patent and Renewal and Application Data'. *The Journal of Industrial Economics*, XLVI, 4: 405–432.

Lev, B. and Ohlson, J. (1989). 'Market-Based Empirical Research in Accounting: A Review, Interpretation, and Extension'. Journal *of Accounting Research*, 20, Supplement: 249–322.

Lev, B., Sarath, B. and Sougiannis, T. (2005). 'R&D Reporting Biases and their Consequences'. *Contemporary Accounting Research*, 22 (4): 977–1026.

Lev, B. and Schwartz, A. (1971). 'On the Use of Economic Concepts of Human Capital in Financial Statements'. *The Accounting Review*, 46 (1): 103–112.

Lev, B., and Sougiannis, T. (1996). 'The Capitalisation, Amortisation and Value Relevance of R&D'. *Journal of Accounting and Economics*, 21: 107–138.

Li, F. and Wong, M. H. F. (2004). 'Employee Stock Options, Equity Valuation, and the Valuation of Option Grants using a Warrant-Pricing Model'. Working Paper, University of Michigan at Ann Arbor and University of Toronto.

Libby, R., Nelson, M. W. and Hunton, J. E. (2006). 'Recognition v. Disclosure, Auditor Tolerance for Misstatement, and the Reliability of Stock-Compensation and Lease Information'. *Journal of Accounting Research*, 44 (3): 533–560.

Lichtenberg, F. R. (1995). 'The Output Contributions of Computer Equipment and Personnel: A Firm Level Analysis'. *Economic Innovations and New Technology*, 3: 201–217.

Lingle, J. and Schiemann, W. (1996). 'From Balanced Scorecard to Strategic Gauges: Is Measurement Worth It?'. *Management Review*, 85: 56–61.

Lipe, R., Bryant, L. and Widener, S. K. (1998). 'Do Non-Linearity, Firm-Specific Coefficients, and Losses Represent Distinct Factors in the Relation Between Stock Returns and Accounting Earnings?'. *Journal of Accounting and Economics*, 25: 195–214.

List, J. A. (2006). 'The Behavioralist Meets the Market: Measuring Social Preferences and Reputation Effects in Actual Transactions'. *Journal of Political Economy*, 114: 1–37.

Liu, M. (2007). 'Accruals and Managerial Operating Decisions over the Firm Life Cycle'. Working Paper, Pennsylvania State University.

Lo, K. and Lys, T. (2000). 'Bridging the Gap Between Value Relevance and Information Content'. Working Paper, University of British Columbia and Northwestern

University.

Magee, S. P. (1977). 'Multinational Corporations, the Industry Technology Cycle and Development'. *Journal of World Trade Law*, 2 (4): 297–321.

Matolcsy, Z. and Wyatt, A. (2006). 'Financial Analysts and Intangible Assets'. *Accounting and Finance*, 46 (3): 457–479.

Matolcsy, Z., and Wyatt, A. (2008). 'The Association Between Technological Conditions and Market Value of Equity'. Forthcoming in *The Accounting Review*.

McCarthy, M., and Schneider, D. (1996). 'Evidence from the US Market of the Association of Capitalized Non-Goodwill Intangibles to Firm Equity Value'. *Advances in International Accounting*, 9: 111–127.

McGahan, A., and Silverman, B. (2006). 'Profiting from Technological Innovation by Others: The Effect of Competitor Patenting on Firm Value'. *Research Policy*, 35: 1222–1242.

Megna, P., and Klock, M. (1993). 'The Impact of Intangible Capital on Tobin's Q in the Semiconductor Industry'. *American Economic Association Papers and Proceedings*, 83 (2): 265–269.

Mendonca, S., Pereira, T., and Godinho, M. (2004). 'Trademarks as an Indicator of Innovation and Industrial Change'. *Research Policy*, 33: 1385–1404.

Metcalfe, J. S. (1998). *Evolutionary Economics and Creative Destruction*. London: Routledge.

Mizik, N. and Jacobson, R. (2006). 'The Information Content of Brand Attributes'. Working Paper, Columbia University Graduate School of Business and University of Washington School of Business.

Muller, K. (1994). 'The Valuation Implications of the Accounting Measurement of Brand Names, Publishing Titles, and Goodwill – Evidence from the Debate in the United Kingdom'. Unpublished Manuscript.

Muller, K. (1999). 'An Examination of the Voluntary Recognition of Acquired Brand Names in the United Kingdom'. *Journal of Accounting and Economics*, 26: 179–191.

Nakamura, L. (2005). 'Underestimating Advertising: Innovation and Unpriced Entertainment'. *Federal Reserve Bank of Philadelphia Business Review*, Q4, 21–29.

Narin, F. (2000). Techline Background Paper, in J. Tidd, (ed.), *From Knowledge Management to Strategic Competence*. Imperial College Press. Series on Technology Management, 3: 155–195.

Nayyar, P. R. (1995). 'Stock Market Reactions to Customer Service Changes'. *Strategic Management Journal*, 16: 39–53.

Netter, J. (1982). 'Excessive Advertising: An Empirical Analysis'. *Journal of Industrial Economics*, 4: 360–373.

Noll, R. G., Peck, M. J. and McGowan, J. J. (1973). *Economic Aspects of Television Regulation*. Brookings Institution, Washington D. C.

Ohlson, J. A. (1995). 'Earnings, Book Value and Dividends in Security Valuation'. *Contemporary Accounting Research*, 11, 661–668.

Pakes, A. (1985). 'On Patents, R&D, and the Stock Market Rate of Return'. *Journal of Political Economy*, 21: 390–499.

Pakes, A. (1986). 'Patents as Options: Some Estimates of the Value of Holding European Patent Stocks'. *Econometrica*, 54: 755–784.

Pavitt, K. (1984). 'Sectoral patterns of technical change'. *Research Policy*, 13: 343–373.

Peles, Y. (1970). 'Amortization of Advertising Expenditures in the Financial in the Financial Statements'. *Journal of Accounting Research*, 8 (1): 128–137.

Penman, S. H. (2004). *Financial Statement Analysis and Security Valuation*. New York, NY: McGraw-Hill.

Porter, M. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York, NY: Free Press.

Porter, M. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, NY: Free Press.

Rajgopal, S., Venkatachalam, M. and Kotha, S. (2003)., 'The Value-Relevance of Network Advantages: The Case of E-Commerce Firms'. *Journal of Accounting Research*, 40 (4): 135–162.

Ramanna, K. and Watts, R. L. (2007). 'Evidence on the Effects of Unverifiable Fair-Value Accounting'. Harvard Business School Working Paper No. 08-014.

Reekie, W.D. and Bhoyrub, P. (1981). 'Profitability and Intangible Assets: Another Look at Advertising and Entry Barriers'. *Applied Economics*, 13: 99–107.

Ritter, A. and Wells, P. (2006). 'Identifiable Intangible Asset Disclosures, Stock Prices and Future Earnings'. *Accounting and Finance*, 46 (5): 843–863.

Roach, S. S. (1991). 'Services Under Siege: The Restructuring Imperative'. *Harvard Business Review*, 69 (5): 82–91.

Rosett, J. G. (1997). 'Capitalized Labor Contracts'. Working Paper, Graduate School of Business, University of Chicago.

Rosett, J. G. (2001). 'Equity Risk and the Labor Stocks: The Case of Union Contracts'. *Journal of Accounting Research*, 39 (2): 337–364.

Rosett, J. G. (2003). 'Labour Leverage, Equity Risk and Corporate Policy Choice'. *European Accounting Review*, 12 (4): 699–732.

Ross, J., and Georgeoff, D. (1991). 'A Survey of Productivity and Quality Issues in Manufacturing: The State of the Industry'. *Industrial Management*, January/February, 33 (1): 3–25.

Rugman, A. M. (1981). *Inside the Multinationals: The Economics of Internal Markets*. New York, NY: Columbia University Press.

Rumelt, R. R. (1991). 'How Much Does Industry Matter?' *Strategic Management Journal*, 12: 167–185.

Schankerman, M. (1991). 'The Private Value of Patent Rights in France, 1969–87: An Empirical Study of Patent Renewal Data'. NBER Working Paper No. 3780.

Schankerman, M. and Noel, M. D. (2006). 'Strategic Patenting and Software Innovation'. London School of Economics and Political Science and University of California, San Diego.

Schankerman, M. and Pakes, A. (1986). 'Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period'. *Economic Journal*, 96 (384): 1052–1077.

Scherer, F. M. (1966). 'Time-Cost Tradeoffs in Uncertain Empirical Research Projects'. *Naval Research Logistics Quarterly*, 13 (2): 71–82.

Schmalensee, R. (1978). 'Entry Deterrence in the Ready-to-Eat Breakfast Cereal Industry'. *Bell Journal of Economics*, 9: 305–327.

Schumpeter, J. (1934). *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Schumpeter, J. (1942). *Capitalism, Socialism and Democracy*. New York, NY: Harper and Brothers.

Seethamraju, C. (2000). 'The Value-Relevance of Trademarks'. Working Paper, New York University.

Serrano, C. J. (2005). 'The Market for Intellectual Property: Evidence from the Transfer of Patents'. Working paper.

Shah, S., Stark, A. W. and Akbar, S. (2007). 'Firm Size, Sector and market valuation of R&D Expenditures'.

Applied Financial Economic Letters, Forthcoming.

Shevlin, T. (1991). 'The Valuation of R&D Firms with R&D Limited Partnerships', *The Accounting Review*, 66: 1–21.

Shevlin, T. (1996). 'The Value Relevance of Non-Financial Information: A Discussion'. *Journal of Accounting and Economics*, 22: 31–42.

Shortage, R. T. (2004). 'Market Valuation of Successful versus Non-Successful R&D Efforts in the Pharmaceutical Industry'. *Journal of Business, Finance and Accounting*, 31 (9–10): 1301–1325.

Simons, R. (1991). 'Strategic Orientation and Top Management Attention to Control Systems'. *Strategic Management Journal*, 12: 49–62.

Skinner, D. (1993). 'The Investment Opportunity Set and Accounting Procedure Choice'. *Journal of Accounting and Economics*, 16: 407–445.

Smith, W. Jr., and Watts, R. (1992). 'The Investment Opportunity Set and Corporate Financing, Dividend, and Compensation Policies'. *Journal of Financial Economics*, 32: 263–292.

Sougiannis, T. (1994). 'The Accounting Based Valuation of Corporate R&D'. *The Accounting Review*, 1: 44–68.

Stark, A. W. and Thomas, H. M. (1998). 'On the Empirical Relationship between Market Value and Residual Income in the U.K.'. *Management Accounting Research*, 9: 445–460.

Stephan, P. E. (1996). 'The Economics of Science', *Journal of Economic Literature*, XXXIV, September, 1119–1235.

Stephan, P. E., Higgins, M. J., and Thursby, J. G. (2007). 'Changing Regimes in Biotechnology: Nobel Affiliates and Valuation'. Working Paper, Georgia State University, Georgia Institute of Technology, and Emory University.

Stern, J., Stewart, G. and Chew, D. (1995). 'The EVA Financial Management System'. *Journal of Applied Corporate Finance*, 8: 32–46.

Stewart, G. (1991). *The Quest for Value*, New York, Harper Business.

Stigler, G. (1958). 'The Economics of Scale'. *Journal of Law and Economics*, 1: 54–71.

Stiglitz, J. E. (1996). 'Plenary Remarks on Intangible Assets'. SEC Symposium on Financial Reporting and Intangible Assets, April 11–12, U. S. Securities and Exchange Commission, Washington D. C.

Stoneman, P. and Toivanen, O. (1997). 'Innovation and Market Value in the United Kingdom: Some Preliminary Results'. Working Paper, Warwick Business School.

Subramanyam, K. R. (1996). 'Uncertain Precision and Price Reactions to Information'. *The Accounting Review*, 71: 207–220.

Thompson, R. W., Beatty, R. P. and Riffe, S. (2001). 'Log-Linear Stock Valuation Based on Accounting Information'. Working Paper, Southern Methodist University and University of Southern California.

Trajtenberg, M. (1990). 'A Penny for your Quotes: Patent Citations and the Value of Innovations'. *RAND Journal of Economics*, 21 (1): 172–187.

Vakratsas, D., and Ambler, T. (1999). 'How Adverting Works: What Do We Really Know?'. *Journal of Marketing*, 63: 26–43.

Vincent, L. (1994). 'The Equity Valuation Implications of Accounting Acquisition Premiums'. Unpublished Manuscript.

Webster, E. (1998). 'Labour as an Asset: Can it Partition the Labour Market?'. Working Paper, Melbourne Institute of Applied Economic and Social Research, University of Melbourne.

Webster, E. (1999). *The Economics of Intangible Investment*. UK: Edward Elgar Publishing Limited.

Wernerfelt, B. (1984). 'A Resource-Based View of the Firm'. *Strategic Management Journal*, 5: 171–180.

Whisenant, S. (1998). 'Does Fundamental Analysis Produce More Value-Relevant Summary Measures?'. Working Paper, University of Houston and Massachusetts Institute of Technology (MIT).

Wilson, D. (1993). 'Assessing the Impact of Information Technology on Organizational Performance' in R. Banker, R. Kauffman, and M. A. Mahmood (eds.), *Strategic Information Technology Management*. Harnsberg, PA: Idea Group.

Wyatt, A. (2005). 'Accounting Recognition of Intangible Assets: Theory and Evidence on Economic Determinants'. *The Accounting Review*, 80 (3): 967–1003.

Zucker, L. G., Darby, M. R. and Brewer, M. B. (1998). 'Intellectual Human Capital and the Birth of U.S. Biotechnology Enterprises'. *The American Economic Review*, 88 (1): 290–306.

Appendix

Table 1
Summary of studies with significant findings

Intangibles/ intangible metric	Value-relevance measure														
	Stock price levels					Stock returns					Financial performance				
	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals
R&D and IP															
Mgt. reported assets	3	2	1	0	3	2	2	2	1	3	1	1	0	0	1
Researcher estimated assets	1	0	0	0	1	3	2	0	0	3	2	1	0	0	2
Annual R&D outlay	5	4	1	0	5	0	0	0	0	0	2	2	0	1	3
Input metrics (e.g. # scientists)	2	2	1	0	2	0	0	0	0	0	0	0	0	0	0
Output metrics (e.g. # patents, citations)	7	5	2	0	7	1	1	1	0	1	2	2	0	0	2
Subtotal	**18**	**13**	**5**	**0**	**18**	**6**	**5**	**3**	**1**	**7**	**7**	**6**	**0**	**1**	**8**
Brands and advertising															
Mgt. reported assets	1	1	0	0	1	0	0	0	0	0	1	1	0	0	1
Researcher estimated assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual advt. outlay	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Input metrics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Output metrics (e.g. customer rankings)	2	2	2	0	2	1	0	0	0	1	0	0	0	0	0
Subtotal	**3**	**3**	**2**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**4**	**1**	**0**	**0**	**4**
Customer loyalty															
Mgt. reported assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Researcher estimated assets	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Annual outlay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Input metrics	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Output metrics	1	1	0	0	1	2	1	0	0	2	2	0	0	0	2
Subtotal	**1**	**1**	**0**	**0**	**1**	**2**	**1**	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**4**

Table 1
Summary of studies with significant findings *(continued)*

Intangibles/ intangible metric	Value-relevance measure														
	Stock price levels					*Stock returns*					*Financial performance*				
	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals	Sig.	Other assets	I.A.< O.A.	Non-sig.	Totals
Competitive advantage															
Mgt. reported assets	1	0	0	0	1	0	0	0	0	0	1	0	0	1	2
Researcher estimated assets	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Annual outlay	2	2	0	0	2	0	0	0	0	0	4	2	0	0	4
Input metrics (e.g. industry)	2	2	1	0	2	0	0	0	0	0	3	2	0	0	3
Output metrics (e.g. market share)	2	2	1	0	2	1	0	0	0	1	3	1	0	0	3
Subtotal	**7**	**6**	**2**	**0**	**7**	**2**	**0**	**0**	**0**	**2**	**11**	**5**	**0**	**1**	**12**
Human capital (including management quality)															
Mgt. reported assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Researcher estimated assets	2	2	1	0	2	1	0	0	0	1	2	2	0	0	2
Annual outlay	1	1	1	0	1	1	0	0	0	1	0	0	0	0	0
Input metrics	1	1	1	0	1	0	0	0	0	0	4	1	0	0	4
Output metrics	1	1	1	0	1	2	1	0	0	2	0	0	0	0	0
Subtotal	**5**	**5**	**4**	**0**	**5**	**4**	**1**	**0**	**0**	**4**	**6**	**3**	**0**	**0**	**6**
Goodwill															
Mgt. reported assets	8	6	3	0	8	2	1	0	0	2	1	0	0	0	1
Researcher estimated assets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual outlay, input and output metrics	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
Subtotal	**8**	**6**	**3**	**0**	**8**	**2**	**1**	**0**	**0**	**2**	**2**	**1**	**0**	**0**	**2**
Totals	**42**	**34**	**16**	**0**	**42**	**17**	**8**	**3**	**1**	**18**	**34**	**16**	**0**	**2**	**36**

Glossary

Sig.	Significant coefficients on the intangible asset measures or metrics
Other assets	Value of 1 if other assets are included in the regression, and zero otherwise
I.A. < O.I.A.	The value of coefficient for intangible assets is less than the coefficient for other intangible assets
I.A. < O.A.	The value of coefficient for intangible assets is less than the coefficient for other assets
Non-sig.	No significant coefficients on the intangible asset measures/metrics

Discussion of 'What financial and non-financial information on intangibles is value-relevant? A review of the evidence'

Jed Wrigley*

Introduction

The speakers at the conference identified that there is a fundamental disconnect between what we see in company accounts and what is happening in capital markets. Anne Wyatt's presentation did a good job of looking at all of the literature in this area, and further identified other work that can be done.

As accounting moves towards a more balance sheet centric view of a company, internally-generated intangibles represent the key difference between book value and the market value. These items can be allocated to a wide range of categories including goodwill, brand value, patents, research and development (R&D), workforce know-how, etc. The presenters to date have mainly been of the opinion that we should not put all of those things on the balance sheet, as they are hard to analyse, and their reliability in particular is unclear. But are accounts true and fair despite this? I think the key question is rather: 'Do analysts get the information they need to value companies properly and can it be improved?'

In the context of organic intangibles, I am very sorry to have to tell anyone that is a great supporter of full fair value of all items on the balance sheet, that I have never heard a financial analyst at two o'clock in the morning, working on their spreadsheet, trying to conclude whether to buy or sell shares of the company, saying: 'God, if only the accountants had given me the answer, I could have gone home six hours ago'. Indeed, if all of those intangible values were starting to appear on the books, I think they would argue that it would actually obfuscate the situation. The reason for this is that current intangible accounting is already

weak and there are enormous problems associated with allocating value between the different intangibles and, indeed, identifying the appropriate units of account for many tangible assets.

To keep the paper to a manageable length, I will just point to three areas of accounting where we already have intangibles, where I do not think current accounting standards work: goodwill, internal intangibles (capitalisation of development costs), and accounting for acquired intangibles.

Goodwill

The issue here is that the identification of impairment cannot be rigorously tested or analysed. In my view, goodwill absolutely should go on the books of companies, and it should be looked at for impairment. Management is accountable for the price they pay to acquire another business, and in order to measure a return on invested capital we need to be able to look at the totality of what they have spent. This necessitates carrying goodwill for as long as management believe that they will earn an adequate return on the investment, followed by a charge against that goodwill if they determine that they have overpaid. The problem is it often takes new management to admit to past mistakes. So it can be quite a long time before we start to see the impact of goodwill that should have been impaired finally making it through the accounts.

Vodafone was a classic example of this. The acquisition of Mannesman and large payments for UMTS licenses had resulted in very significant intangibles being put on the balance sheet of the company. Initially, during the 'TMT Bubble', the market assumed that this value was reasonable and the shares traded at a premium to book value. Vodafone suffered in the ensuing bear market as people realised that they had paid far too much for these assets and the shares traded at a significant discount to reported book values, with analysts explaining why the book values could not earn their cost of capital. It was not until 2006, however, when they took a £23.5bn write-down that price-to-book trended back towards parity and more

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	BMW			Volkswagen			Renault		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
EBITDA margin reported	13.8%	14.5%	14.6%	11.6%	11.3%	12.0%	9.2%	10.8%	9.7%
Operating margin reported	8.1%	8.4%	8.1%	1.9%	1.8%	2.9%	3.3%	5.3%	3.2%
R&D % capitalised	39%	40%	45%	44%	36%	35%	30%	38%	37%
R&D cap/sales	2.4%	2.5%	3.0%	2.1%	1.7%	1.5%	1.5%	1.8%	2.0%
EBITDA margin all expensed	11.4%	11.9%	11.6%	9.4%	9.6%	10.5%	7.7%	9.0%	7.7%
Operating margin all expensed	7.1%	7.4%	6.7%	1.4%	1.4%	2.9%	2.5%	4.6%	2.6%

Source: FIL, JP Morgan, Company Accounts

recently above. So the accounts had finally caught up.

This clearly illustrates the fundamental disconnect between accounting and capital markets as it took the management and their accountants five years to reflect market reality in the accounts and, in retrospect, earlier 'reality' in the TMT bubble had been wrong anyway.

Internal intangibles

The table above illustrates the accounting for development costs for three major car companies. IAS 38 was hoped to bring us some clarity through greater disclosure and commonality of capitalisation for this development expenditure. If done well, we would lose the divergence in accounting practice and company accounts would become more comparable, a huge potential benefit for analysts who often focus more on comparison of stocks in their coverage rather than assessing absolute value.

As the table shows the reality has been that we have ended up with every analyst having a significantly more complicated spreadsheet, because they now have to work out what was the total R&D cash spend, how much they have capitalised, the impact on operating profit this year, and how this has changed from one year to the next. As you can see here, the practice does give some strange messages. For example, BMW has gone from capitalising 39% of their total R&D spend in 2003 to 45% in 2005; Volkswagen has gone from 44% to 35%; and Renault from 30% to 37%. The proportion of R&D capitalised as a per cent of sales for those three businesses has gone from 2.4% to 3.0% for BMW, 2.1% to 1.5% for Volkswagen and 1.5% to 2.0% for Renault. These changes can cause wide divergences between profits from one year to the next and can widen the gap between cash flow and reported profits.

This divergence would be fine if we could analyse in detail what was going on and see a relationship between the development programmes and spikes in R&D spending because of a new product that is about to be launched and revenues

generated later. This is the strength of accounting where we see matching of the expenditure and revenues in the income statement. But the reality is, thus far, we are unable to see a significant linkage in that area and analysis suggests that R&D cash flows are more stable than expenditure recognised through the income statement. This can be contrasted with capital expenditure and the associated depreciation expense where we see more predictable expenditure in the income statement than in cash flow.

Acquired intangible assets

When analysing non-goodwill acquired intangible assets that appear on the balance sheet, I break them down into two types: a group that I would describe as wasting assets and a group that I would describe as organically replaced assets. The wasting assets are the standard ones we might think about – patents or publishing rights. For most of these assets you can make fairly reliable estimates of the fair value. If it is a pharmaceutical company buying a patent, you can predict sales, how much it will cost you to market it and so forth, and you can come up with a value. You also know when that patent is going to expire because it has a finite life. You can therefore assess an appropriate charge for the income statement that reflects the diminution in value of the asset as it wastes. Current accounting is appropriate for these assets.

Organically replaced assets are a little bit more complicated, and customer lists are my specific 'bugbear'. If you look at the customer list that the business actually acquired, it will be a wasting asset: those same customers over a period of time will rotate off. Nevertheless, companies will organically continue to spend money on marketing, promotion and their sales force with these costs charged through their income statement. Their aim will be to at least maintain or hopefully grow their customer list organically replacing those which have wasted. The impact of current accounting is that you have a 'double whammy' in the income statement. There is a charge for the cost of maintaining that asset and you are charging amortisa-

tion against the value of the acquired asset. The reality of where we are in accounting today is that accounting standards force companies over a period of time to fade their businesses to look as if they had not grown by acquisition, whereas in reality they have, and we gradually lose sight of the assets that they bought against which we should be able to hold them accountable for generating a return.

To illustrate the issue, I will make some comments about Reed Elsevier but only because their disclosure is clearer than most. The company has made a significant number of acquisitions over the years and analysts tend to ignore the amortisation of acquired intangibles, when calculating their underlying performance, as the organically replaced assets are generally the most common component. Indeed, Reed Elsevier reports an adjusted operating profit number that is pretty compliant with what analysts tell them they want to see: operating profit before the amortisation of acquired intangible assets, and before any non-recurring items.

In 2006 a review of the accounts shows a £297m adjustment for acquired intangibles, 24% of their adjusted operating profit of £1.2bn. Included in this amount was £191m, or almost 70%, which related to content and software. It is quite likely that a proportion of these assets may indeed be wasting in nature. We cannot, from this disclosure, identify how much organic expense they are incurring to maintain some of the value of the content or indeed update and improve it, which is critical in determining the appropriate treatment to reflect the underlying economics.

For many companies, management remuneration is often linked to the adjusted profits number rather than the reported number. This might affect management decision making as they might conclude it is better to go out and buy content rather than develop it internally, because the cost of that content will go against an amortisation number that will be added back for adjusted earnings. As I mentioned before, I have used Reed Elsevier as their disclosure is clear and in their case, management have been very open when they make acquisitions about the value that they expect to generate. This is not always the case and accounting for intangibles arising through acquisitions can create problems for analysts.

Conclusion

Balance sheets need not reflect the economic or fair value of the operations for analysts and other users to reach valid conclusions when looking at a set of accounts. What is important is that we understand the operational transactions that have taken place in order that we identify what profits the management have actually earned utilising the operational capital that they have invested, organ-

ically or by acquisition. This is the 'operational stewardship' role of management.

'Financial stewardship' is slightly different. In this case we are looking at how management have performed with respect to the financial exposures of the enterprise as these can also impact on shareholder value. I am generally more supportive of using fair value for these items, which would include pensions.

One thing to think about when we are looking at this gap between capital market values and financial statements is that a level 1 valuation – the best valuation you can get – already exists for the aggregate intangibles for a business. The market cap at the year-end minus the tangible book value could be used as the value of the intangibles. There just follows an exercise in attribution of that value between the different sorts of intangible assets. The problem is that the component parts are completely subjective and I would argue that there is little point in paying valuers to make this attribution. I can illustrate this by simply taking the value of a brand. How much is genuine brand value, where customers perceive a benefit from the brand; and how much of it could be simply customer inertia? You just need to think about your own relationship with your telecommunications provider or your bank. How much of the reason that you stay with the same provider is because it is just too much hassle to change, and how much is it because there genuinely is brand value in that business? That does not mean to say that customer inertia ('customer lists'), can protect you and has long-term value, as Northern Rock recently discovered!

I should also point out that the attribution exercise is even more complicated than I have illustrated above, where I assumed that the tangible book value is a known quantity. In reality, if we move towards fair value of operating activities, the unit of account or valuation methodology can have a huge impact on the value of the tangible assets too. To illustrate: if we take the value of a factory, is the fair value the sum of the value of the land, buildings and each piece of equipment at replacement cost or is it the net present value of the cash flows arising from the production activities or even the expected disposal value on liquidation? Depending on what you choose, values will show wide divergence and the larger the unit of account, the greater the dependence on layers of assumptions which cannot really be tested. It would also mean that users would lose sight of the capital that management have invested upon which they are expected to generate a return. This would lead to a very unsatisfactory outcome and few could argue that the financial statements would be very 'value relevant' or informative despite the price-to-book being closer to one.

Some observers would argue that financial statements should reflect all the movements in fair values as this more accurately reflects the performance of management from one year to the next, measuring the success of brand building or a successful new project being completed that will deliver returns for many years. I would dispute the idea that this needs to be displayed in the financial statements, as capital markets always find a way to solve these issues. In this case the way that most businesses do it, is by ensuring that management has a significant proportion of their bonus and other compensation linked to total shareholder returns, often through share option participation and so forth. The returns maximising strategy for management will often be to grow the intangible value and communicate with their shareholders why their actions have increased the net present value of the business via improved customer retention, higher brand values, better training of their staff, richer pipeline of new products and so forth. Such

communication in the management commentary should be encouraged. I know it is an area that the IASB will look at in time and believe that this is an important project to make sure users get enough information to enable them to more accurately value businesses but I do not think that the right place to carry the value of the business is in the balance sheet.

The question is: 'What is value-relevant?' To answer the question, we looked at the level of the S&P 500 compared to reported S&P 500 EPS going back over the last 130 years. This analysis gave us an R2 of 96% over this period, which seems to indicate that 'earnings' are value-relevant. I appreciate that defining earnings is complex but most analysts, investment banks and fund management groups that I talk to have a very similar view on what constitutes earnings that they are 'prepared to put a multiple on'. The IASB should focus on giving us earnings numbers, robustly defined and clearly presented.

Does measuring intangibles for management purposes improve performance? A review of the evidence

Christopher D. Ittner*

Abstract—Despite the development of dozens of frameworks and techniques for measuring intangible assets, an open question is whether the internal measurement of intangible assets for management purposes is associated with higher economic performance. This paper provides an overview of the statistical evidence on the performance consequences of intangible asset measurement. Although the bulk of these studies provide at least some evidence that intangible asset measurement is associated with higher performance, many are limited by over-reliance on perceptual satisfaction or outcome variables, inadequate controls for contingency factors, simple variables for capturing complex measurement practices, and the lack of data on implementation practices. I conclude by offering suggestions for improving and extending studies on the performance consequences of intangible asset measurement.

Key words: intangible assets; intellectual capital; non-financial performance measures; balanced scorecard; performance evaluation.

1. Introduction

The belief that intangible assets have become key drivers of economic performance has prompted a growing number of firms to emphasise intangible asset measures for internal decision-making and control purposes. At the same time, an increasing number of measurement frameworks such as the Balanced Scorecard (Kaplan and Norton, 1996), Performance Prism (Neely et al., 2002), and Intangible Assets Monitor (Sveiby, 1997), among many others, have been developed by academics and consultants to guide these measurement efforts. A key question is whether greater measurement of intangible assets for management purposes actually improves economic performance, and whether any performance benefits are contingent on the firm's organisational environment and specific measurement practices.

This paper provides a broad overview of statistical evidence on the links between the internal measurement of intangible assets (typically using non-financial indicators) and economic performance, with particular emphasis on studies examining actual economic results rather than survey respondents' self-assessments of measurement system satisfaction or organisational performance. This evidence takes two general forms: (1) large-sample, cross-sectional studies investigating

whether firms making greater use of intangible asset measures for decision-making or compensation purposes are associated with higher accounting performance and stock returns; and (2) quasi-experimental, company-level analyses examining whether accounting performance improved after the adoption of measurement systems with greater emphasis on intangible assets. Consistent with Franco and Bourne's (2004) review of the performance measurement literature, the evidence indicates that the strength of the statistical relations between intangible asset measurement and organisational performance declines as the sophistication of the analysis increases. The majority of cross-sectional studies support the hypothesis that greater use of intangible asset measures for internal purposes is positively associated with organisational performance, with stronger results using self-reported performance rather than actual accounting or stock market returns. These studies also suggest that the performance benefits from intangible asset measurement are contingent on the extent to which the measures and their relative importance are appropriate for the organisation's chosen strategy, value drivers, and competitive environment. Quasi-experimental analyses of performance effects in individual companies, on the other hand, provide mixed evidence on the benefits from intangible asset measurement, with some finding positive relations and some finding no relation between intangible asset measurement and economic performance.

The mixed evidence in company-specific, quasi-experimental studies is consistent with research indicating that many individual firms find it difficult

to link improvements in their intangible asset measures to financial gains (e.g. Ittner and Larcker, 2003, 2005). Research suggests that these difficulties may have more to do with implementation problems than with the lack of benefits from intangible asset measurement. Studies find that technical and organisational barriers prevent many firms from identifying appropriate measures or assessing the economic benefits from intangible asset measurement. I therefore review the factors found to hinder the ability of firms to achieve or assess the economic benefits from improvements in intangible asset measures.

The remainder of the paper is organised as follows. The next section provides a brief discussion of the reasons for measuring intangible assets, followed by a review of studies on the economic benefits from the internal measurement of these assets. As part of this review, I examine studies on the influence of 'causal business models' or 'strategy maps' on the benefits from intangible asset measurement. A growing number of commentators argue that causal models or strategy maps are critical components of effective performance measurement systems (e.g. Kaplan and Norton, 2004; Ittner and Larcker, 2003; Marr et al., 2004). I then review studies on the technical and organisational barriers that can prevent firms from achieving economic benefits from intangible asset measurement. The final section offers my conclusions and some suggestions for future research.

2. The internal measurement of intangible assets

Intangible assets represent expenditures on and development of non-physical assets that are drivers of future economic performance and firm value. Andriessen's (2004a) review of the performance measurement literature identifies seven primary reasons for internal measurement of intangible assets: (1) focusing attention ('what gets measured gets managed'); (2) improving the management of intangible resources; (3) creating resource-based strategies; (4) monitoring effects from actions; (5) translating business strategy into action; (6) weighing possible courses of action; and (7) enhancing the management of the business as a whole.

A wide variety of techniques have been developed to measure intangible assets and achieve these objectives. Andriessen (2004b), for example, identifies more than 30 related measurement techniques in the performance measurement literature, divided into those focused on the financial valuation of intangible assets and those focused on non-financial indicators of intangible asset development.

Despite surveys finding widespread international adoption of various intangible asset measurement techniques, research on the benefits of these

techniques is limited. The majority of published papers are normative and provide little or no evidence on the benefits of these techniques. Much of the limited research on performance effects is conducted by consulting firms and/or is based on survey respondents' perceptions of the benefits their organisations have received from intangible asset measurement. As a result, the intangible asset measurement literature has been criticised for being overly focused on developing new techniques rather than on assessing the techniques' impact. Given this criticism, I attempt to synthesise the results from existing performance tests, to identify limitations in this research, and to offer suggestions for future research.

3. Studies on the economic benefits from intangible asset measurement

3.1. Cross-sectional studies using perceived performance outcomes

One method for assessing the performance effects from intangible asset measurement is conducting a cross-sectional study that examines whether firms making greater or more appropriate use of intangible asset measures or measurement techniques such as the Balanced Scorecard achieve higher performance. A key research design issue is deciding how to evaluate the importance placed on intangible asset measures (Ittner et al., 2003). One approach is to assess the diversity in the types of performance measures used by the organisation, under the assumption that greater measurement diversity ensures that important information on the wide variety of intangible assets that are present in most companies is not ignored.

A second approach examines the weight placed on traditional financial measures relative to the weight on non-traditional measures in areas such as customers, employees, innovation, and quality. The assumption underlying this approach is that over-reliance on traditional financial measures leads firms to become myopic and to under-emphasise development of critical intangible assets.

A more sophisticated approach attempts to assess the 'match' or 'fit' between the firm's sources of competitive advantage and its reliance on intangible asset measures. Following agency and contingency theories on the choice of performance measures (e.g. Brickley et al., 1997; Fisher, 1995), this approach assumes that intangible asset measures are not equally beneficial in all settings, and that the emphasis placed on these measures should vary with the importance of intangible assets to firm success.

A final approach examines whether specific measurement techniques, particularly the Balanced Scorecard, are associated with higher performance. In this approach, researchers assess either the

extent to which survey respondents claim to use measures related to the four Balanced Scorecard perspectives (even though Kaplan and Norton (1996) state that a Balanced Scorecard consists of more than measurement in these four perspectives), or the extent to which respondents claim to use a Balanced Scorecard (based on a simple yes/no response or a scale such as 'not at all' to 'extensive use'), with little attention paid to the particular measures or methods (such as the development of 'strategy maps') used when implementing the technique.

A second major research design issue is whether performance outcomes are assessed using managers' perceptions of measurement system or organisational success, or using actual economic results. Most studies using perceptual outcomes find significant positive associations between self-reported intangible asset measurement and perceived performance. For example, Lingle and Schiemann (1996) report that firms claiming to make regular use of a diverse set of measures and having management agreement over strategic success factors achieve statistically higher self-reported industry standing, financial performance relative to competitors, and progress in managing change efforts. Likewise, Hoque and James (2000) find a significant positive association between perceived organisational performance and the use of a diverse set of measures related to the four Balanced Scorecard categories. Hall (2008), in turn, analyses the factors mediating the relation between comprehensive performance measurement systems and managers' self-reports of their own performance (rather than that of their organisations), and concludes that the effect of comprehensive measurement systems on a manager's rating of his or her performance arises from increased role clarity and psychological empowerment.

Similarly, studies on the Balanced Scorecard frequently examine whether scorecard systems are related to measurement system satisfaction (e.g. Banker et al., 2001; Chenhall and Langfield-Smith, 1998; Kaplan and Norton, 2001; Rigby, 2001; Sandt et al., 2001). These studies typically find greater satisfaction with or higher perceived performance from Balanced Scorecards than from other measurement practices.

Other studies examine whether perceived performance is associated with the 'match' or 'fit' between the importance of intangible assets to the firm's competitive success and the organisation's reliance on intangible asset measures. Abernethy and Guthrie (1994), Chong and Chong (1997), and Bouwens and Abernethy (2000), among others, support the hypothesis that diverse measurement systems have a stronger positive association with self-reported performance in firms following

innovation- or differentiation-oriented strategies (which are likely to be related to the importance of intangible assets) than in other firms. Olson and Slater (2002) and Hoque (2005) also find perceived overall performance relative to competitors positively associated with the extent to which the organisation matches its use of measures in the four Balanced Scorecard categories to its strategy and competitive environment. These studies support the hypothesis that intangible asset measures are not equally beneficial in all settings. Instead, these measures appear to be more effective when intangible assets are more important drivers of long-term economic success.

Although most studies using perceptual outcome measures find significant positive associations with intangible asset measurement, a smaller subset finds mixed results. In a more sophisticated cross-sectional study, Widener (2006) develops a structural equations model linking the importance of human, structural, and physical capital to self-reported financial performance through the types of performance measures employed. She finds only partial support for her hypothesis that various performance measurement practices mediate the associations between intangible assets and perceived financial performance. In particular, Widener finds that human and structural capital have direct effects on financial performance in non-manufacturing firms, as well as indirect effects through the use of employee and operational measures. In manufacturing firms, human capital has no significant effect on firm performance, structural capital has direct and indirect effects (through employee measures), and physical capital only has an indirect association with performance through the use of employee measures (even though employee capital has no significant effect). Van der Stede et al. (2006) report that firms following quality-oriented strategies use more objective and subjective performance measures than other firms, but that only subjective measures increase perceived performance in quality-oriented firms. Hyvonen's (2007) results indicate that the use of 'contemporary' performance measures (i.e. non-financial measures, qualitative measures, Balanced Scorecards, and customer surveys) leads to higher perceived customer-related performance in firms that do not follow a customer-focused strategy, but not in those following a customer-focused strategy, contradicting theories that intangible asset measurement systems are more effective when intangible assets (such as the customer asset examined in Hyvonen's study) are more important to organisational success.

Although studies using perceptual outcome measures provide preliminary evidence on the benefits from intangible asset measurement and useful insights into some of the factors influencing

its effectiveness, they suffer from three limitations that are unique to this research design. First, the same respondent typically answers questions on both the performance measurement system and organisational outcomes. This can lead to 'common method bias' (Podsakoff et al., 2003), with the strong positive associations driven by the tendency of respondents to answer all questions in a survey in a similar manner (e.g. all high or all low) or the possibility that perceptions about one set of questions (such as performance) bias responses to another (such as performance measurement practices).

Second, the perceptual outcome scales often leave considerable room for interpretation. For example, surveys commonly ask respondents to rate performance relative to competitors or internal expectations on a scale from 1 = 'significantly below' to 5 = 'significantly above'. However, differences in the choice of competitive peers, internal targets, or the interpretation of 'significant' can lead to substantially different responses. In addition, the outcome measures often relate to unspecified 'overall' performance or are based on self-reported performance on multiple financial and non-financial dimensions (with the measures equally-weighted or weighted based on the performance dimensions' perceived importance). For example, Hoque and James (2000) measure performance (ranging from 1 = 'below average' to 5 = 'above average') using equally-weighted responses to survey questions on the organisation's performance on both financial (return on investment (ROI) and return on sales (ROS)) and non-financial dimensions (capacity utilisation, customer satisfaction, and quality). But these three non-financial dimensions may not reflect the intangibles measures used by the organisation (in fact, only customer satisfaction performance is directly related to the four categories of scorecard measures examined in their study) and equal weighting may not reflect their actual (or even perceived) importance to economic value improvement.

Moreover, research indicates that improvements in non-financial performance dimensions do not always translate into improved economic results (e.g. Ittner and Larcker, 2005). The lack of significant economic gains from improvements in intangible asset measures can occur for a variety of reasons, such as an ineffective strategy, poor measures, inappropriate improvement targets, gaming of measures and targets, and organisational barriers that prevent improvements from reaching the bottom-line. As a result, a positive association between intangible asset measurement and perceived improvements in intangible performance dimensions does not necessarily imply improved economic performance.

3.2. Cross-sectional studies using actual economic outcomes

An alternative cross-sectional research design links intangible asset measurement to actual accounting performance or stock returns. Studies using actual economic results are far fewer in number than studies using perceptual outcome measures. Similar to Hyvonen's (2007) results using perceived performance, Ittner and Larcker's (1995) investigation of quality-oriented measurement practices in automobile and computer firms finds that greater reliance on non-traditional measurement techniques (i.e. 'bottom-up' data gathering, non-financial and team-based rewards, and frequent reporting of quality information) is positively associated with return on assets (ROA) in organisations making less extensive use of formal quality improvement practices, but finds no significant association in organisations with extensive quality management programmes. The evidence in the Ittner and Larcker (1995) and Hyvonen (2007) studies suggests that alternatives to formal intangible asset measurement may be available for providing the information and incentives needed to support well-developed customer- and quality-oriented strategies.

In a related study, Ittner and Larcker (1997a) find that quality-based rewards have a significant positive association with ROS (but not ROA) in the computer industry, but have no significant effect on accounting performance in the automobile industry. Taken together, the results in these studies provide only mixed support for claims that intangible asset measurement improves performance.

Said et al. (2003) provide stronger evidence that the use of intangible asset measures in reward systems is associated with higher economic performance. Their study uses proxy statement disclosures by US firms to investigate whether the use of or weight on non-financial measures in CEO bonus contracts is related to firm performance. They find that firms using both financial and non-financial measures in bonus contracts, and those placing greater weight on non-financial measures, have significantly higher current and future stock market returns, as well as higher future ROA. Moreover, their results again indicate that the performance effects from non-financial measures are contingent on the extent to which the emphasis placed on these measures is appropriate for the firm's operational and competitive characteristics. If too much or too little emphasis is placed on intangible asset measures given the firm's characteristics and strategic objectives, economic performance is lower.

The significant contemporaneous relations with stock returns but not accounting returns in the Said et al. (2003) study may indicate that the market an-

ticipates future operating improvements from intangible asset measurement, and impounds this expectation into current stock price. Ittner et al. (2003) find similar differential effects when accounting or stock returns serve as their outcome variables. Using a sample of US financial services firms, they examine the cross-sectional associations between several publicly-available economic measures (ROA, sales growth, one-year stock returns, and three-year stock returns) and survey-based responses on performance measurement practices. Unlike most studies, their survey instrument incorporates a wide variety of performance measurement uses (problem identification and action plan development, capital investment evaluation, managerial performance evaluation, and external disclosure) and ten specific categories of tangible and intangible 'value driver' measures, rather than a general variable reflecting the relative importance of financial and non-financial measures. They find that firms using a diverse set of measures have higher stock returns, particularly when measurement diversity is greater than that of firms with similar strategies or value drivers. ROA, on the other hand, is not statistically associated with intangible asset measurement practices, even in the subsample of firms with more mature measurement systems. Although Balanced Scorecard users report higher satisfaction with their measurement systems, ROA in scorecard users is statistically *lower* and stock returns are not statistically different than non-users, providing no support for the claimed economic benefits from Balanced Scorecard implementations.

One explanation for the lower ROA in the self-proclaimed scorecard adopters examined by Ittner et al. (2003) is that underperforming firms are more likely to adopt measurement innovations such as the Balanced Scorecard in the hopes of improving performance, and that these adopters' systems were not in place long enough at the time of the study to yield economic results. However, additional analysis does not support this conjecture. Ittner et al. (2003) find that Balanced Scorecard users reporting no significant changes in their measurement systems in the past two years do *not* have significantly higher economic performance *or* satisfaction, suggesting that even the higher satisfaction from scorecard systems may be short-lived.

Braam and Nijssen's (2004) examination of Balanced Scorecard practices in Dutch firms also finds higher perceived performance but lower accounting performance when Balanced Scorecard usage is greater. In particular, firms with 'measurement-focused' scorecard use (defined as intensive use of a comprehensive measurement system) report statistically lower change in ROI and no significant difference in perceived company per-

formance, while those with 'strategy-focused' scorecard usage (defined as the interaction between an innovation-oriented strategy and the use of a measurement-focused scorecard) report higher perceived performance but *no* significant difference in accounting return changes. Like Ittner et al.'s (2003) results, this evidence raises questions regarding the validity of studies using perceptual outcome measures such as satisfaction or perceived performance.

In sum, cross-sectional studies using actual economic outcomes provide some evidence that intangible asset measurement is associated with higher performance, though the results tend to be weaker than those using perceptual outcome variables (particularly with respect to Balanced Scorecard usage). Consistent with agency and contingency theories, cross-sectional studies using both perceptual and actual outcome measures generally find that performance is enhanced when the emphasis on intangible asset measures is aligned with the organisation's sources of competitive advantage. Thus, it is unlikely that intangible asset measures are equally valuable in all settings, and may actually be detrimental in some circumstances.

While generally supporting the claim that intangible asset measurement can be beneficial, the results in all large sample, cross-sectional studies must be approached with caution. One difficulty is accurately assessing complex performance measurement practices using a survey instrument and a single respondent per firm, the dominant source of data in these studies. For example, measurement choices include not only the specific types of measures and their relative importance, but also the specific techniques used to measure these attributes (e.g. financial or non-financial measures; survey responses, counts, percentages, or time-based measures; quantitative or qualitative measures; relative or absolute measures, etc.) and the performance targets set for the measures. Compensation plans (the most frequently examined measurement use) also have many important attributes other than the measures in the plan (such as the amount of pay at risk and the presence of performance hurdles or payout caps) that are likely to influence their performance effects. In some cases, it is hard to even specify the specific attributes that distinguish a given measurement framework or technique. For example, what exactly constitutes a 'Balanced Scorecard', and how can a researcher determine whether a company is using one or not? Ittner et al. (2003), for example, find that financial services firms that claim to use a scorecard do not place statistically greater emphasis on non-financial measures and are no more likely to have developed a 'strategy map' (which Kaplan and Norton (1996) argue is a fundamental element of a Balanced Scorecard) than those that

do not claim to use a scorecard. Without more extensive details on firms' measurement systems, it is hard to conclude that the use of intangibles measures, rather than other related measurement or incentive system attributes, drives any observed performance effects.

Difficulties assessing measurement practices using a survey are compounded by the fact that many survey-based studies do not specify the specific decision context the measures are used for (e.g. capital investment, business performance evaluation, problem-solving, or rewards), making it difficult to determine whether respondents considered the same contexts when giving their answers. This can be a significant problem since theoretical studies indicate that the optimal use of a specific performance measure for one purpose need not be optimal for another.

Even when more targeted survey questions are used, the ambiguity may not be resolved. Consider a question on the organisations' use of intangible asset measures for evaluating managerial performance. Does greater use of intangibles measures for managerial performance evaluation refer to termination decisions, salary increases, bonuses, promotions, or some mix of the four? Campbell's (2008) study of a US fast food chain, for example, finds managers' bonuses more strongly associated with financial measures, but promotions more strongly associated with non-financial measures that may be better indicators of success in subsequent positions. His results suggest that even a question on the use of different measures for managerial performance evaluation may yield different answers depending upon the specific context considered by the survey respondent.

A second limitation is the potential lag between measurement system implementation and any resulting performance effects. One of the primary reasons for measuring intangible assets is capturing information on key drivers of long-term performance that is not captured in current accounting measures. However, researchers (and companies) rarely know how long it takes (or is expected to take) before changes in intangible asset measures yield economic results, making it difficult to specify the appropriate lag in empirical models. HassabElnaby et al.'s (2005) examination of compensation contracts for US executives also finds that many firms abandon the use of non-financial measures within one to two years, which may not be long enough to motivate mangers to optimally choose the long-term investment level in intangible assets. If intangible asset measures are *leading* indicators of firm performance, the implementation of intangible asset measurement systems may have little short-term effect on performance. Although Said et al. (2003) examine both current and future performance and Ittner et al. (2003)

provide evidence on the performance effects of more mature systems that have not been changed significantly in the past two years, none of the preceding studies gathers data on when the systems or measures were actually implemented.

A bigger concern is causality. Even though a significant positive statistical association is found between intangible asset measures and performance, it may simply reflect correlation rather than causation. As noted earlier, the choice of performance measures is only one of many elements in performance measurement systems, and it is possible that these other elements, rather than the specific performance measures, drive any performance differences. Similarly, performance measurement systems are often implemented together with other organisational innovations, strategic changes, or reorganisations which, if not controlled for in the statistical model (as many studies do not do), can lead to erroneous inferences. More broadly, performance measurement systems are endogenous choices that numerous studies have found to be associated with factors such as industry, strategy, performance improvement techniques, regulation, and interdependencies (e.g. Banker et al., 1993; Bushman et al., 1996; Ittner et al., 1997). If the predictor variables are endogenous choices and their determinants are not included in the statistical model, the variables will be correlated with the true (but unobserved) error term in the statistical model. As a result, regression parameter estimates will be inconsistent because of correlated omitted variable problems. Though some of the preceding studies make attempts to account for these issues, causality and endogeneity remain serious concerns that future studies must make greater effort to address.

3.3. Quasi-experimental, company-specific studies

A small subset of researchers have traded off the enhanced generalisability of large sample, cross-sectional studies for the greater research control available in quasi-experimental studies using company-specific time series data. In these studies, performance is compared before and after the implementation of the intangible asset measurement system, with a sample of non-adopters used to further control for time series trends and other common factors that potentially influence performance in all of the units but are unrelated to the new systems (Cook and Campbell, 1979). Banker et al. (2000), for example, examine the implementation of an incentive system containing non-financial measures in a US hotel chain. In addition to controlling for a number of location-specific demographic factors that are likely to influence hotel performance, the authors use franchisees of the hotel chain (which did not implement the new system) to control for other factors that may impact

on all members of the chain (e.g. advertising campaigns or economic changes). They find statistically significant improvements in both customer satisfaction and financial performance in adopters of the new system, with their many controls providing greater confidence that the gains were driven by the new incentive system.

Davis and Albright (2004) use a similar research design to investigate whether branches of a Canadian bank that implemented a Balanced Scorecard achieved higher financial performance than branches in the same bank that did not implement such a system, with the adopters and non-adopters representing distinct geographic regions. Although financial performance was similar in the two sets of branches prior to the scorecard implementation, the adopters achieved significantly higher financial performance after implementing scorecards. Surprisingly, the performance gains were achieved within *one month* of the scorecard implementation date and did not increase further in subsequent months – surprising because the non-financial measures in Balanced Scorecards are claimed to overcome the overly short-term focus of financial measures in traditional performance measurement systems. If improvements in the non-financial Balanced Scorecard measures lead to financial performance improvements in one month, the need for these measures to overcome the (perceived) short-term bias in financial performance measures is unclear since any improvements in non-financial measures are reflected in financial measures on an almost contemporaneous basis, defeating the need for leading indicators. However, since the adopting and non-adopting branches were not matched on important factors such as size, location, and customer base (and the authors do not control for these factors in their statistical tests), and because the paper does not report whether improvements in the financial measures (which were also used in the previous measurement system) were associated with changes in the new non-financial scorecard measures, it is hard to conclude that the gains were due to intangible asset measurement rather than to a 'Hawthorne Effect' from increased emphasis on a new performance measurement system.

In contrast to the positive results reported by Banker et al. (2000) and Davis and Albright (2004), quasi-experimental studies by Neely (2007) and Griffith and Neely (2007) reach conflicting conclusions regarding the benefits from Balanced Scorecard systems. Neely (2007) uses data from two sister divisions of a UK wholesale electronics chain, one of which implemented a scorecard and one which did not. Although the implementing division achieved improvements in sales and profits, statistically similar improvements are also found in a geographically matched set of stores in the sis-

ter division, providing no support for the performance benefits from the Balanced Scorecard.

Griffith and Neely's (2007) results are mixed. Their sample consists of branches belonging to two UK divisions of a heating and plumbing distributor. One division implemented a new incentive plan using the Balanced Scorecard and the other retained the existing profit-based plan. After matching on postal code and controlling for other factors expected to result in differences in division performance (due to one division focusing on commercial customers and the other focusing on retail customers), they find that the Balanced Scorecard did not increase profits in all implementing branches. Instead, costs increased faster than sales in some of the implementing units. However, the Balanced Scorecard appears to have had a favourable effect in branches with more experienced managers, indicating that different decision-makers are not equally prepared to take advantage of the extra information provided in scorecard systems.

Although existing small sample, quasi-experimental studies are few in number, may not generalise to broader samples, focus exclusively on incentive plans, and provide only mixed support for claims that intangible asset measurement improves performance, they offer some of the most powerful tests of the claimed benefits from intangible asset measurement and highlight some of the implementation problems associated with these measures. Similar studies can greatly improve our understanding of intangible asset measurement and its implications.

3.4. Intangible asset measurement and causal business models

Recent work on intangible asset measurement increasingly argues that a key element of effective measurement systems is the development of explicit 'causal business models' or 'strategy maps'. Causal business models represent the hypothesised cause-and-effect relations between investments in intangible assets and economic performance, as expressed or assumed in the company's strategic plan. Proponents of causal business modelling claim that the explicit development of these models forces organisations to answer the question, 'How are intangible assets supposed to improve our firm's financial performance?'. By providing managers with the company's expectations regarding the links between improvements in intangible assets and economic results, explicit causal business models are claimed to improve communication of strategic goals, increase the focus on intangible assets, improve performance measure choices and decision-making, and enhance performance evaluation (e.g. Kaplan and Norton, 2004; Marr et al., 2004). However, the use of causal busi-

ness models is not universally embraced. Norreklit (2000, 2003), for example, questions the cause-and-effect relations among the four Balanced Scorecard perspectives, as well as the top-down control model embedded in the modelling process.

Consistent with the claimed benefits from explicit causal business models, experimental studies show that providing causal models to employees can reduce the over-emphasis on short-term financial measures in performance evaluations (Banker et al., 2004), enhance accountants' evaluation of benchmark data that require the assessment of cause-and-effect relations (Vera-Munoz et al., 2007), and reduce conflicts between supervisors and subordinates in Balanced Scorecard evaluations (Wong-On-Wing et al., 2007).

Survey-based studies also provide preliminary evidence that the provision of causal business models can be beneficial. Banker et al.'s (2007) survey of US Chief Financial Officers finds greater satisfaction with performance measurement systems that enable employees to understand organisational linkages, while Chenhall's (2005) survey of Australian firms indicates that integrative performance measurement systems that articulate strategic and operational linkages are positively associated with perceived organisational learning. In Ittner and Larcker's (2003) survey of a diverse set of US firms, those reporting that they consistently build and verify causal business models have significantly higher publicly-reported ROA and ROE than those that do not. In a second study of US financial services firms (Ittner et al., 2003), respondents claiming to rely extensively on formal business models report statistically higher perceived measurement system satisfaction and achieve higher publicly-reported ROA, but business models are not significantly associated with publicly-reported sales growth or stock returns.

Although these studies suggest that explicit causal business models provide potential advantages, surveys indicate that most firms have not developed formal causal models, and those that do frequently do not test whether the hypothesised linkages actually hold in practice. Ittner and Larcker (2003), for example, report that only 30% of their sample develop formal causal models, and only 23% attempt to verify the causal links. Nearly 30% of the firms they surveyed place no reliance on a formal business model, and only 35% make substantial to complete use.

Small sample studies suggest that the failure to develop and validate causal business models may be one reason why some firms find it difficult to link improvements in intangible assets to economic performance. Campbell et al. (2006) examine a Balanced Scorecard implementation in a US convenience store chain and find that causal analysis of the data in the scorecard could have been used

to identify strategic problems and highlight improvement opportunities, particularly with respect to employee capabilities. However, the chain did not perform this analysis, which the authors claim could have prevented the failure of the firm's strategy. Ittner and Larcker (2003, 2005) analyse the causal models in a wide variety of manufacturing and service firms and conclude that management intuition regarding causal models is often incomplete or inaccurate, leading managers to chase strategies and metrics that may be inappropriate.

Malina et al.'s (2007) examination of a large US company's scorecard, on the other hand, finds little or no statistically significant relation between the linked performance measures in the company's causal model, yet the company expressed satisfaction with the system and firm profitability. The authors conclude that an effective management control system does not require statistically significant cause-and-effect relations when other factors create a strong climate of control.

Taken together, the limited existing evidence on causal business modelling suggests that this practice may be beneficial in some settings, but may not be a necessary condition for effectively linking intangible assets to economic performance. Future research can make a significant contribution by examining the conditions under which explicit causal models contribute to performance gains, and the specific practices for developing and validating causal models that are most effective.

3.5. Implementation issues

One important set of factors missing in most performance tests are implementation issues. Qualitative studies have identified a wide variety of implementation issues that potentially influence performance measurement outcomes (see Bourne et al. (2003) and Franco-Santos and Bourne (2005) for reviews). These issues can be broadly classified into technical and organisational factors.

Technical factors include issues such as the choice and weighting of measures, target setting, and information system capabilities. Even if an intangible asset category is important, important decisions must still be made regarding the specific measures and measurement methodologies for that category. Dozens of potential measures are available for any intangible asset dimension, and organisations must decide which of these measures to incorporate in their measurement systems. Yet empirical studies find that different methods for measuring the same dimension can have a significantly different ability to explain economic performance (e.g. Ryan et al., 1995; Sedatole, 2003), making the decision regarding the specific measures to use far from straight-forward. In addition, Hemmer's (1996) model shows how differences in the measurement of non-financial performance di-

mensions (e.g. the use of numbers vs. ratios for measuring customer satisfaction) can influence the measures' incentive effects. Difficulties determining the appropriate measures and methodologies can be even greater for intangible asset dimensions that are more qualitative in nature (Cavalluzzo and Ittner, 2004). This evidence suggests that the specific measures and measurement methodologies used by the organisation, rather than the simple measurement of intangible asset categories, have the greatest influence on economic performance.

Another important issue is setting targets for the measures. Research suggests that the relation between intangible asset measures and financial results is often non-linear, with diminishing or negative returns at higher intangibles levels (e.g. Ittner and Larcker, 1997b, 2005). For example, 100% satisfied employees and customers or maximising the number of patents are unlikely to be optimal in most companies. However, Ittner and Larcker (2003, 2005) find that many (if not most) companies make little or no attempt to determine the appropriate targets for intangible asset measures. Unless some attempt is made to determine the point of diminishing or negative returns, companies may be investing too much in improving intangible asset measures.

Other target-setting difficulties arise when different performance objectives conflict in the short-term. For example, investments in many intangible asset dimensions, such as research and development or brand building, can reduce short-term accounting performance due to expensing rules, but generally do not improve economic performance for some time. When the lags between improvements in intangible asset measures and economic performance are unclear, companies find it hard to set appropriate short-term goals for the conflicting performance dimensions (e.g. Gates, 1999).

In addition, despite the growth in computer capabilities and integrated software programs, many firms still face problems getting their disparate systems to provide timely performance measures in a consistent format that facilitates performance evaluation and data analysis, due to factors such as inconsistent identifiers, units of analysis, and timing of measurement in various databases (Bourne et al., 2003; Ittner and Larcker, 2003; Jiang et al., 2007). Cavalluzzo and Ittner (2004) find that data limitations do not influence the implementation of performance measurement innovations, but limit the self-reported use of the resulting information for accountability and decision-making purposes.

Organisational barriers may be even harder to overcome than technical barriers. One significant organisational barrier is the internal politics of performance measurement choice and use. As Waggoner et al.'s (1999) inter-disciplinary review of the performance measurement literature notes,

performance measures have a powerful effect on power distributions within organisations. As a result, organisational participants may resist changes in existing 'rules of the game' (such as the introduction of intangible asset measures) or fight for the introduction of measures that reflect their activities in a more favourable light. In many cases, power issues lead to an ever-increasing growth in intangible asset measures as managers push their own measures to ensure that their efforts are recognised and rewarded (Ittner and Larcker, 2003). Organisational disputes over who 'owns' different measures (or 'data fiefdoms') can also hamper the exchange of data across functions and hinder the company's ability to assess linkages among measures, limiting their effectiveness. If the choice and use of intangible asset measures reflect internal politics more than the development of leading indicators of firm performance, performance tests will be unlikely to detect any economic benefits from intangible asset measurement.

Finally, the influence of intangibles measurement on economic performance is likely to be influenced by management's commitment to the measures' use. Top management support can ensure adequate resources are made available for implementation and ongoing data analysis, can focus organisational attention on the measures, and can prevent short-term financial concerns from dominating decision-making and performance evaluations (Franco-Santos and Bourne, 2005).

As the implementation literature highlights, even if the use of reliable and valid intangible asset measures offers economic benefits in a given setting, technical and organisational barriers can limit these benefits, reducing a researcher's ability to identify performance gains if these issues are not incorporated into the research design and statistical models.

4. Conclusions and issues for future research

The evidence reviewed in this paper identifies some of the difficulties in assessing whether or when internal measurement of intangible assets improves economic performance. Although the bulk of studies provide at least some evidence that intangible asset measurement is associated with higher performance, many are limited by over-reliance on perceptual satisfaction or outcome variables, inadequate controls for contingency factors, simple variables for capturing complex measurement practices, and the lack of data on implementation practices. Future studies must take account of these research design issues if our understanding of the performance benefits from intangible asset measurement is to improve.

In addition, opportunities exist to extend research on the links between intangible asset measurement

and economic outcomes. First, researchers can examine whether the effects of financial or valuation-based intangible asset measures (such as human capital accounting or brand valuation) differ from those of non-financial measures (such as employee satisfaction, training, or turnover or brand awareness). To date, performance studies have not distinguished between the two types of measures, and have tended to classify any measures that are not traditional accounting measures as non-financial. Not only does this ignore the fact that many intangible asset measures can be either financial or non-financial, but also the many advances that have been made in intangible asset valuation (see Andriessen (2004b) for a review).

Another opportunity is examining a broader set of intangible asset measurement uses. The vast majority of studies examine reward and performance evaluation systems. But these measures are also used for other purposes such as decision-making, problem identification, and forecasting. Moreover, some economic theories suggest that the measures used for valuing a business need not be useful for assessing a manager's performance (e.g. Gjesdal, 1981; Paul, 1992; Feltham and Xie, 1994). Consequently, restricting the analysis to managerial performance evaluation and reward systems is likely to provide only a partial understanding of firms' measurement practices and measurement system performance consequences.

Finally, greater use of small sample or quasi-experimental studies is recommended. Although the generalisability of these studies is limited to some extent by the specific settings being examined, they offer greater opportunity to control for confounding factors than large sample, cross-sectional studies. More importantly, only through intimate knowledge of research sites can the full complexity and nuances of performance measurement implementation and use be fully understood and incorporated into the analysis and interpretation of statistical tests of performance implications.

References

Abernethy, M. and Guthrie, C. (1994). 'An empirical assessment of "fit" between strategy and management of information system design'. *Accounting and Finance*, 20: 241–258.

Andriessen, D. (2004a). 'IC valuation and measurement: classifying the state of the art'. *Journal of Intellectual Capital*, 5: 230–242.

Andriessen, D. (2004b). *Making Sense of Intellectual Capital*. Burlington, MA: Butterworth-Heinemann.

Banker, R., Chang, H. and Pizzini, M. (2004). 'The balanced scorecard: judgmental effects of performance measures linked to strategy'. *The Accounting Review*, 79: 1–23.

Banker, R., Janakiraman, S. and Konstans, C. (2001). *Balanced Scorecard: Linking Strategy to Performance*. New York, NY: Financial Executives International.

Banker, R., Janakiraman, S. and Pizzini, M. (2007). 'Determinants of chief financial officers' satisfaction with performance measurement systems'. Working paper, Temple University, University of Texas at Dallas, and Southern Methodist University.

Banker, R., Potter, G. and Schroeder, R. (1993). 'Reporting manufacturing performance measures to workers: an empirical study'. *Journal of Management Accounting Research*, 5: 35–55.

Banker, R., Potter, G. and Srinivasan, D. (2000). 'An empirical investigation of an incentive plan that includes nonfinancial performance measures'. *The Accounting Review* 75 (1): 67–92.

Bourne, M., Neely, A., Mills, J. and Platts, K. (2003). 'Implementing performance measurement systems: a literature review'. *International Journal of Business Performance Management*, 5: 1–24.

Bouwens, J. and Abernethy, M. (2000). 'The consequences of customization on management accounting system design'. *Accounting, Organizations and Society*, 25(3): 241–258.

Braam, G. and Nijssen, E. (2004). 'Performance effects of using the balanced scorecard: the Dutch experience'. *Long Range Planning*, 37: 335–349.

Brickley, J. Smith, C. and Zimmerman, J. (1997). *Managerial Economics and Organizational Architecture*. Burr Ridge, IL: Richard D. Irwin.

Bushman, R., Indjejikian, R. and Smith, A. (1996). 'Aggregate performance measures in business unit compensation: the role of intrafirm interdependencies'. *Journal of Accounting Research*, 33: 101–128.

Campbell. D. (2008). 'Nonfinancial performance measures and promotion-based incentives'. *Journal of Accounting Research*, 46: 297–332.

Campbell, D., Datar, S., Kulp, S. and Narayanan, V. (2006). 'Using the balanced scorecard as a control system for monitoring and revising corporate strategy'. Working paper, Harvard University.

Cavalluzzo, K. and Ittner, C. (2004). 'Implementing performance measurement innovations: evidence from government.' *Accounting, Organizations and Society*, 29: 243–267.

Chenhall, R. (2005). 'Integrative strategic performance measurement systems, strategic alignment of manufacturing, learning and strategic outcomes: an exploratory study'. *Accounting, Organizations and Society*, 30: 395–422.

Chenhall, R. and Langfield-Smith, K. (1998). 'The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach'. *Accounting, Organizations and Society*, 23: 243–264.

Chong, V. and Chong, K. (1997). 'Strategic choices, environmental uncertainty and SBU performance: a note on the intervening role of management accounting systems'. *Accounting and Business Research*, 27(4): 268–276.

Cook, T. and Campbell, D. (1979). *Quasi-Experimentation: Design & Analysis Issues for Field Settings*. Chicago: Rand McNally.

Davis S. and Albright, T. (2004). 'An investigation of the effect of balanced scorecard implementation on financial performance'. *Management Accounting Research*, 15: 135–153.

Feltham, G. and J. Xie. (1994). 'Performance measure congruity and diversity in multi-task principal/agent relations'. *The Accounting Review* 69: 429–453.

Fisher, J. (1995). 'Contingency-based research on management control systems: categorization by level of complexity.' *Journal of Accounting Literature*, 14: 24–53.

Franco, M. and Bourne, M. (2004). 'Are strategic perform-
ance measurement systems really effective: a closer look
at the evidence.' *Proceedings of the EurOMA Conference*,
INSEAD, Paris, Vol. 2, June: 163–174.

Franco-Santos, M. and Bourne, M. (2005). 'An examina-
tion of the literature relating to issues affecting how com-
panies manage through measures'. *Production Planning
& Control*, 16: 114–124.

Gates, S. (1999). *Aligning Strategic Performance Measures
and Results*. New York, NY: The Conference Board.

Griffith, R. and Neely, A. (2007). 'Incentives and manage-
rial experience in multi-task teams: evidence from within
a firm'. Working paper, Institute for Fiscal Studies and
Cranfield School of Management.

Gjesdal, F. (1981). 'Accounting for stewardship'. *Journal
of Accounting Research*, 19: 208–231.

Hall, M. (2008). 'The effect of comprehensive perform-
ance measurement systems on role clarity, psychological
empowerment and managerial performance'. *Accounting,
Organizations and Society*, 33 (2/3): 141–163.

HassabElnaby, H., Said, A. and Wier, B. (2005). 'The re-
tention of nonfinancial performance measures in compen-
sation contracts'. *Journal of Management Accounting
Research*, 17: 23–42.

Hemmer, T. (1996). 'On the design and choice of
'modern' management accounting measures'. *Journal of
Management Accounting Research*, 8: 87–116.

Hoque, A. (2005). 'Linking environmental uncertainty to
non-financial performance measures and performance: a
research note'. *The British Accounting Review*, 37:
471–481.

Hoque, Z. and James, W. (2000). 'Linking balanced score-
card measures to size and market factors: impact on orga-
nizational performance'. *Journal of Management
Accounting Research*, 12: 1–17.

Hyvonen, J. (2007). 'Strategy, performance measurement
techniques and information technology of the firm and
their links to organizational performance'. *Management
Accounting Research*, 18: 343–366.

Ittner, C. and Larcker, D. (1995). 'Total quality manage-
ment and the choice of information and reward systems'.
Journal of Accounting Research, 34 (Supplement): 1–34.

Ittner, C. and Larcker, D. (1997a). 'Quality strategy, strate-
gic control systems, and organizational performance'.
Accounting, Organizations and Society, 22: 293–314.

Ittner, C. and Larcker, D. (1997b). 'Are nonfinancial meas-
ures leading indicators of financial performance? An
analysis of customer satisfaction'. *Journal of Accounting
Research*, 36 (Supplement): 1–35.

Ittner, C. and Larcker, D. (2003). 'Coming up short on
nonfinancial performance measurement'. *Harvard
Business Review*, 81 (11): 88–95.

Ittner, C. and Larcker, D. (2005). 'Moving from strategic
measurement to strategic data analysis'. In C. Chapman
(ed.), *Controlling Strategy*, Oxford, UK: Oxford
University Press: 86–105.

Ittner, C., Larcker, D. and Rajan, M. (1997). 'The choice of
performance measures in annual bonus contracts'. *The
Accounting Review*, 72: 231–255.

Ittner, C., Larcker, D. and Randall, T. (2003). 'Performance
implications of strategic performance measurement in fi-
nancial services firms'. *Accounting, Organizations and
Society*, 28: 715–741.

Jiang, Z., Sarkar, S., De, P. and Dey, D. (2007). 'A frame-
work for reconciling attribute values from multiple data
sources'. *Management Science*, 53: 1946–1963.

Kaplan, R. and Norton, D. (1996). *The Balanced
Scorecard: Translating Strategy into Action*. Boston, MA:
Harvard Business School Press.

Kaplan, R. and Norton, D. (2001). *The Strategy Focused
Organization: How Balanced Scorecard Companies
Thrive in the New Business Environment*. Boston, MA:
Harvard Business School Press.

Kaplan, R. and Norton, D. (2004). 'Measuring the strategic
readiness of intangible assets'. *Harvard Business Review*,
February: 52–63.

Lingle, J. and Schiemann, W. (1996). 'From balanced
scorecard to strategic gauges: is measurement worth it?'.
Management Review, 85: 56–61.

Malina, M., Norreklit, H., and Selto, F. (2007). 'Relations
among measures, climate of control, and performance
measurement models'. *Contemporary Accounting
Research*, 24: 935–982.

Marr, B., Schiuma, G. and Neely, A. (2004). 'The dynam-
ics of value creation: mapping your intellectual perform-
ance drivers'. *Journal of Intellectual Capital*, 5: 312–325.

Neely, A. (2007). 'Does the balanced scorecard work: an
empirical investigation'. Working paper, Cranfield School
of Management.

Neely, A., Adams, C. and Kennerly, M. (2002). *The
Performance Prism: The Scorecard for Measuring and
Managing Business Success*. London, UK: FT Prentice
Hall.

Norreklit, H. (2000). 'The balance on the balanced score-
card – a critical analysis of some of its assumptions'.
Management Accounting Research, 11: 65–88.

Norreklit, H. (2003). 'The balanced scorecard: what is the
score? A rhetorical analysis of the balanced scorecard'.
Accounting, Organizations and Society, 28: 591–619.

Olson, E. and Slater, S. (2002). 'The balanced scorecard,
competitive strategy, and performance'. *Business
Horizons*, May–June: 11–16.

Paul, J. (1992). 'On the efficiency of stock-based compen-
sation'. *Review of Financial Studies*, 5: 471–502.

Podsakoff, P., MacKenzie, S., Lee, J. and Podsakoff, N.
(2003). 'Common method biases in behavioral research: a
critical review of the literature and recommended reme-
dies'. *Journal of Applied Psychology*, 88: 879–903.

Rigby, D. (2001). 'Management tools and techniques: a
survey'. *California Management Review*, 43(2): 139–160.

Ryan, M., Buzas, T. and Ramaswamy, V. (1995). 'Making
CSM a power tool'. *Marketing Research*, 7(3): 10–16.

Said, A., HassabElnaby, H. and Wier, B. (2003). 'An em-
pirical investigation of the performance consequences of
nonfinancial measures'. *Journal of Management
Accounting Research*. 15: 193–223.

Sandt, J., Schaeffer, U. and Weber, J. (2001). 'Balanced
performance measurement systems and manager satisfac-
tion – empirical evidence from a German study'. Working
paper, WHU – Otto Beisheim Graduate School of
Management.

Sedatole, K. (2003). 'The effect of measurement alterna-
tives on a nonfinancial quality measure's forward-looking
properties'. *The Accounting Review*, 78: 555–581.

Sveiby, K-E. (1997). *The New Organizational Wealth:
Managing and Measuring Intangible Assets*. San
Francisco, CA: Berret-Koehler.

Van der Stede, W., Chow, C. and Lin, T. (2006). 'Strategy,
choice of performance measures, and performance'.
Behavioral Research in Accounting, 18: 185–205.

Vera-Munoz, S., Shackell, M. and Buehner, M. (2007).
'Accountants' usage of causal business models in the
presence of benchmark data: a note'. *Contemporary
Accounting Research*, 24: 1015–1038.

Waggoner, D., Neely, A. and Kennerley, M. (1999).
'The forces that shape organizational performance
measurement systems: an interdisciplinary review'.
International Journal of Production Economics, 60/61:

53–60.
Widener, S. (2006). 'Associations between strategic per-
formance resource importance and performance measure
use: the impact on firm performance'. *Management*

Accounting Research, 17: 433–457.
Wong-On-Wing, B., Guo, L., Li, W. and Yang, D. (2007).
'Reducing conflict in balanced scorecard evaluations'.
Accounting, Organizations, and Society, 32: 363–377.

Discussion of 'Does measuring intangibles for management purposes improve performance? A review of the evidence'

Julian Heslop*

I have spent over 30 years in industries ranging from brewing, foods, property and latterly pharmaceuticals and consumer healthcare.

I am convinced from my own experience that measuring intangibles for management purposes does improve performance.

What are these intangible assets? They are the patents that protect our medicines that take over ten years of high risk research and development (R&D) to create; they are the trademarks that protect our consumer healthcare brands; and in other industries they are the intellectual property that have generally taken years of investment and consumer experience to create. The return to companies and their investors for this significant development investment is intellectual property protection that allows for future premium pricing and higher volume sales.

GlaxoSmithKline (GSK) has an enterprise value of some £65bn compared to a net asset value (before debt) if you look at the most recent consolidated balance sheet of £16bn. The main difference between the two is the value of the company's intellectual property comprising its marketed medicines, vaccines and consumer healthcare brands but also its new product pipeline. Under current accounting, which I believe to be correct, there is no capitalisation of internal R&D costs.

Hopefully the preceding paragraph makes clear that intangibles have significant value for GSK as they do for many other companies and that this value is reflected in the premium prices received for products protected by intangible assets. Given this value it is important that intangibles are appropriately monitored for internal management purposes to ensure their value is preserved and enhanced.

Certain simple financial measures such as absolute sales and profit values and comparative growth to previous accounting periods provide clear measures of performance for both internal

management and for external investors. However, these generally reflect what has happened rather than the key drivers of future performance.

My biggest lesson in this respect was when I was sent as a young accountant to the East Coast of the US for a short period and worked with a small restaurant chain which primarily served families. The business was performing well; sales, profit and spend per customer were all increasing and management were pleased with the progress being made and attributed it to the innovative changes they had recently made to the menu. However, fortunately, there were other measures also used by management to assess progress in building 'the restaurant chain's value reputation' as it was this intangible that was the key to future growth in a very competitive market. Significantly, one key measure which was falling was 'value for money'. The lesson from this was that sales and profit would shortly decline if no action was taken as this sector was highly competitive and very value-for-money focused.

Analysis revealed that the new menu with its greater choice and higher prices may have pleased most of the restaurant's customers but did not please the payer (usually the father in those days) who found the bill some 20% higher than he expected. Additionally, although sales were rising the number of customers began to fall. In conclusion, the business was forced to change the menu and delete some of the higher-priced items and fortunately did so before the brand reputation for value had been inexorably weakened. I left the US with a clear understanding of the importance of measuring brand health and not being totally focused on just the key financial measures.

In my present business there are a number of non-financial measures that provide an assessment of the intellectual property that drive the majority of the value of the business. These include, as you would expect in the pharmaceutical industry, safety monitoring but also market share and other customer market data that monitor the relative strength of the company's products. We monitor

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these and react to changes.

Within our R&D organisation, for example, employees are incentivised based on progress in meeting objectives to move projects through the pipeline to approval. This is critical in providing new medicines for society and for driving future sales growth.

In conclusion, measuring intangibles which represent the most significant part of many companies' value is important in improving performance. Linking employee remuneration to these measures is beneficial where employees have a direct impact on the measure, but generally not otherwise. It is important that there is consistency of measurement over time and that management focuses on the few key measures that will drive future value. It is as damaging to dilute management by focusing on too many measures as it is to look at none at all.

Increasingly in the 21st century, enhancing the value of intangibles will be key to future wealth creation and economic prosperity.

Intangibles and research – an overview with a specific focus on the UK

Plus ça change, plus c'est la même chose

Andrew W. Stark*

1. Introduction

There were four papers presented at the 2007 Information for Better Markets Conference on Intangibles and Research. Basu and Waymire (2008) express extreme scepticism as to whether balance sheet recognition of intangibles is possible. Their argument, at least in part, is that intangibles are not separable from tangible assets. Further, the value of intangible assets, whether singly or in combination, is best judged by emphasising the forecasting of future profit streams, as opposed to explicit balance sheet recognition. As stated by the authors, '[v]aluing accounting intangibles on a stand-alone basis requires heroic assumptions about separability, highly uncertain estimates of ambiguous future benefits, and arbitrary allocations of jointly produced income.' Further, intangible assets, when assessed at the macro-level for countries, are linked to government policies with respect to activities such as education and, as a consequence, it is difficult to identify them with specific firms.

Skinner (2008) evaluates policy proposals and concludes that private incentives to disclose information about intangibles, over and above that disclosed in the US, are the best solution, with regulators, at best, providing guidance as to the forms that these disclosures could take. This is based upon an analysis that critically evaluates whether current US accounting can be associated with the claimed difficulties in the US (e.g. under investment, difficulties in raising capital, etc., primarily related to technology firms and research and development (R&D)) – he argues it cannot.

Wyatt (2008) provides an extremely comprehensive analysis of the associations between financial and non-financial information on various types of intangibles and market value or returns (a real boon to academics!) – the work surveyed is global,

although much of it emanates from the US. Whilst making recommendations for future research, she suggests, amongst others, that regulators might do better if more discretion were given to managers to recognise intangible assets (as in the UK and Australia prior to IAS adoption). She also suggests that disclosures could be enhanced to include more broad categories of expenditure.

Ittner (2008) considers whether internal measurement systems for intangibles, primarily for reward and performance evaluation purposes, are associated with superior performance. He finds some evidence that the measurement systems are associated with superior performance – including stock market performance – but little evidence about particular measures. His review suggests the complexity of business models within which wealth generation is achieved via expenditures on activities thought to have the potential to generate intangible assets.

Overall, the contents of the four papers suggest little reason to fundamentally change recognition practices, although arguments for small changes at the margin could be made (i.e. the allowing of discretion with respect to categories of development expenditures). Arguments are put forward for enhanced disclosure requirements with respect to items such as advertising expenditures. Voluntary disclosure mechanisms are seen as the most viable mechanisms for disclosures relevant to understanding the wealth creation possibilities of expenditures on potential intangible assets, if only because of the complexity and heterogeneity of the business models within which such activities are set. In this context, an argument could be made for accounting standard setters to provide general frameworks within which such voluntary disclosures can be made. Because much (but not all) of the evidence and arguments in the papers presented comes from the US, I will focus on the UK, particularly UK evidence that is available, and applying some of the arguments and recommendations to the UK. I will also focus on financial reporting and mandatory and voluntary disclosure possibilities and practices.

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2. Accounting for R&D expenditures

2.1. Observations on the history of accounting for R&D expenditures in the UK and the views of analysts and company accountants

It is illuminating to consider the history of accounting for R&D expenditures in the UK. Hope and Gray (1982) provide an illustration of the deliberations surrounding the introduction of SSAP 13 *Accounting for Research and Development* (ASC, 1977). In the UK, the initial standard was developed through a process involving two similarly titled exposure drafts, namely ED 14 (ASC 1975) and ED 17 (ASC 1976), resulting in SSAP 13 (ASC 1977).

During the process of development of the final standard, the recommended treatment evolved from: (i) requiring the immediate expensing of all R&D expenditures (ED 14); to (ii) the immediate expensing of all research expenditures plus the mandatory capitalisation and subsequent amortisation of development expenditures which satisfy certain criteria, with the immediate expensing of all other development expenditures (ED 17); to (iii) the immediate expensing of all research expenditures *plus* the optional capitalisation and subsequent amortisation of some development expenditures which satisfy certain criteria, with the immediate expensing of all other development expenditures (SSAP 13). Further, the issue of disclosure evolved from the disclosure of R&D expenditures (ED 14) to the disclosure of the amount carried forward, *plus* the balance and movement on the deferred R&D account (ED 17 and SSAP 13). Hope and Gray (1982) point out that this evolution was occurring at a time when it seemed clear that most UK firms (93%) immediately expensed all R&D expenditures.

Hope and Gray (1982) provide a discussion of why the standard evolved, relative to the responses received from interested parties to the two exposure drafts. With respect to ED 14, most respondents did not object to the immediate write-off of all R&D expenditures. Some firms proposed that some capitalisation of development expenditures should be allowed – but the motive for such a view mainly concerned the way in which government contracts worked in the aerospace industry. Some of the professional firms responding supported this latter view on the grounds of the matching principle.

When ED 17 responded to these concerns, by making the capitalisation of qualifying development expenditures mandatory, some companies expressed concern that this requirement should be mandatory, arguing instead that it should be optional. Nonetheless, some argued that allowing any form of capitalisation constituted a retrograde step in that it would produce an accounting for R&D expenditures out of step with other international

standards. The voluntary capitalisers won the argument, producing the voluntary capitalisation option in SSAP 13.

With respect to disclosures regarding R&D expenditures, there was more objection at the ED14 stage to the requirement to disclose R&D expenditures. Hope and Gray (1982) identify eight correspondents commenting unfavourably. The common view amongst these respondents was '... that anything other that extensive disclosure of (e.g.) individual project expenditures and estimated success rates of projects, would be misleading to users of accounts. Their reason for not allowing extensive disclosure included, inter alia, problems of definition, comparability, materiality, and advantage to competitors' (Hope and Gray, 1982: 544–545). When ED 17 eliminated the requirement to disclose R&D expenditures, only one accounting firm, and the Department of Industry, objected.

Eventually, SSAP13 was revised to recommend the disclosure of R&D expenditures, for firms meeting certain size thresholds, but only in 1989. Stoneman and Toivanen (2001) analyse the impact of the revision of SSAP 13 on the disclosure of R&D expenditures by UK public companies. Their analysis suggests that the revision of SSAP 13 produced a large increase in the disclosure of R&D expenditures across all classes of firms. Nonetheless, by the end of the period they study (1994), their results suggest that only about 50% of firms were disclosing R&D expenditures.

Subsequent to the development of SSAP 13, and its revision, Goodacre and McGrath (1997) investigate whether UK analysts demonstrate myopic behaviour with respect to the treatment of R&D expenditures. Via an experimental study, their evidence suggests that analysts are not misled by the immediate expensing of R&D expenditures. The authors conclude that their results suggest 'analysts recognise the long term importance of R&D investment and are not myopic in this respect.' Their study also invited analysts taking part in the experiment to comment upon the accounting treatment of R&D expenditures. The authors report one characteristic quotation which states 'I believe R&D should be written off as it is incurred ... there is no certainty that development will lead to a ... return on investment ... There is even less certainty that basic research will. Writing off R&D ... does not allow for any value judgements ... by top management with a vested interest.'

Nixon (1997) surveys the views of company accountants about the accounting treatment of R&D expenditures. Of the accountants surveyed, the vast majority of their companies immediately wrote off all R&D expenditures. Further, the bulk of respondents did not believe that this accounting treatment had any adverse economic consequences, in terms of their companies' market values or ability to raise

finance. Finally, Nixon (1997) states that, for the respondents, 'disclosure of information is the key factor determining the value the capital markets attribute to a company's R&D expenditure rather than its treatment; the tension between the accruals and prudence concepts that pre-occupy the accounting standard-setters is ... of little relevance to their R&D accounting.' Interestingly, the respondents also suggested that much of this disclosure occurred outside of the regular financial statements via meetings with analysts and institutional investors, although many companies provided fairly detailed, objective, and verifiable, descriptions of their R&D activities outside the audited parts of their financial statements

Overall, the history of the development of UK standards for the recognition and disclosure of R&D expenditure suggests that there was no enormous demand for any treatment other than immediate expensing. Certainly, there was no demand for any widespread capitalisation of research expenditures. Further, although the situation evolved to incorporate the mandatory disclosure of R&D expenditures, some concerns were expressed as to whether a single number was likely to be informative without further details of the particular projects being pursued and the likelihood of their success. Further, issues of confidentiality and associated likelihood of proprietary costs were raised with respect to disclosure.

Subsequent work does not alter the view above with respect to accounting for R&D expenditures. Judging from Goodacre and McGrath (1997) and Nixon (1997), little demand exists from analysts or companies for the capitalisation of R&D expenditures. Companies do not believe that there are adverse consequences associated with the immediate write-off of R&D expenditures. What might have changed between the gestation period of SSAP 13 and now is the attitude towards disclosure about the nature of R&D activities, whether in the financial statements or outwith. Company accountants now see this as the main method via which the capital markets recognise the value of R&D activities.

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[1] Strictly speaking, given that Green et al. (1996) add RD expense back to earnings before creating residual income, the appropriate test for value relevance could be argued to be not whether the coefficient of RD is significantly different from zero but rather whether that coefficient equalled the negative of the coefficient for RI. Were that test not to be rejected, it would imply that the RI and RD terms could be amalgamated into (RI-RD) without any loss of explanatory power. Given that the coefficient RI is significantly positive and sometimes below and sometimes above that for RD for all estimates, operating the suggested value relevance test might have produced significant results. Nonetheless, the emphasis in Green et al. (1996) was on the market (intangible asset) valuation of RD, not the value relevance of RD expense.

2.2. The value relevance of R&D expense in the UK

A number of studies have reported on the association between R&D expense and market values in the UK, whether that association was the focus of the paper or not. The earliest paper in this number is Green et al. (1996). They collect data on UK listed firms for 1990, 1991 and 1992 reporting R&D expense, with sample sizes of 190 firms in 1990, 232 in 1991, and 240 in 1992. They estimate the following basic equation:

$$MV - BV = \alpha_0 + \alpha_1 BV + \beta RI + \gamma RD + \varepsilon \qquad (1)$$

where:

MV   is market value of the firm, measured six months after the financial year-end;

BV   is closing book value;

RI   is residual income associated with *the tangible assets of the firm*, measured as profits before exceptional and extraordinary items *plus* R&D expenditures *less* the product of the firm cost of capital multiplied by opening book value;

RD   is R&D expense; and

ε is a mean zero random variable.

Equation (1) is estimating in deflated form, using book value as the deflator, and with a number of control variables added in after deflation (firm market share, annual concentration ratio for the firm's industry, firm debt ratio, average annual industry debt ratio, the square of the difference between the firm and the average annual industry debt ratio, annual firm return volatility).

Effectively, their model suggests that the excess of market over book value can be captured as the sum of a multiple of book value, capitalised residual income, R&D capital (expressed as a multiple of current R&D expense, because of the persistence in R&D expense — as in, for example, Hirschey and Weygandt, 1985), and the effects of the control variables.

The results are not totally convincing with respect to the value relevance of R&D expenditures. In the annual regressions, the coefficient of R&D expense is only positive and significantly different from zero, using heteroscedasticity-adjusted standard errors, and at the 5% level of significance, for 1991 – for 1990 and 1992, it is positive and significant at the 10% level.[1] When extreme values are removed, the coefficients of R&D expense are positive but barely significant, even at the 10% level. When the data is pooled across years (with or without extreme values), or rank regressions (a form of robust regression) are run on the annual or pooled data, or weighted least squares techniques are used on the undeflated version of equation (1), the coefficient of R&D expense is positive and significant at the 5% level. The overall conclusion

reached by Green et al. (1996: 210) is that '... it would be difficult to accuse the market of totally ignoring the value-relevance of past research and development expenditures that are yet to have an effect on earnings' – not necessarily the most ringing endorsement of the value relevance of R&D expense (as pointed out by Wyatt, 2008).

Stronger evidence, however, is provided by Stark and Thomas (1998) who, although not focussing on the value relevance of R&D expense, nonetheless effectively update Green et al. (1996). The fullest model they estimate is represented by the following equation:[2]

$$MV = \alpha_0 + \alpha_1 BV + \beta(E + RD) + \gamma RD \qquad (2)$$
$$+ \delta LBV + \varepsilon$$

where:

E   is profits before exceptional and extraordinary items; and

LBV is opening book value.

This specification ignores the control variables in Green et al. (1996), which added relatively little to explanatory power in that study. Rather than using the residual income variable of Green et al. (1996), equation (2) can be viewed as splitting it up into its components – earnings before exceptional and extraordinary items, with R&D expense added back, and opening book value times the cost of capital. Effectively, then, equation (2) is an unconstrained version of equation (1) if the firm cost of capital can be treated as a constant across firms.[3]

To estimate equation (2), annual cross-sections are constructed for 1990 to 1994. Unlike Green et al. (1996), the annual samples are not restricted to only firms reporting R&D expense. The results are much more positive in favour of the value relevance of R&D expense, with the coefficients on all the annual cross-sections and the pooled data being positive and significant at the 5% level. Further, the actual increases in explanatory power associated with the addition of R&D expense into the firm value equation are sizeable enough to be noticed not merely statistically.

Finally, Akbar and Stark (2003) provide the most recent and comprehensive evidence for the UK. Like Stark and Thomas (1998), the focus of this paper is not on the value relevance of R&D expense. Akbar and Stark (2003) include it in their regressions as a control variable because, in their view, the two studies described above established a case for the value relevance of R&D expense. As a consequence, to increase the power of their tests with respects to the value relevance of the variables they were concerned about (dividends and capital contributions), R&D expense should be included as a control variable. Using all non-financial firm-years for which relevant data is available

from 1990 to 2001, the fullest model they estimate is as below:

$$MV = \alpha_0 + \alpha_1 BV + \beta RI + \gamma RD + \delta D \qquad (3)$$
$$+ \varsigma CC + \eta OI + \varepsilon$$

where:

D   is dividends declared;
CC   is capital contributions; and
OI   is an estimate of the Ohlson (1989) concept of 'other information'.

Equation (3) is estimated using four deflators – book value, number of shares, sales and opening market value. Estimates of the coefficient of R&D from pooling all the data are significant for all deflators.[4] Although the results for the annual cross-sections are not provided, footnote 8 (Akbar and Stark, 2003: 1232) of the paper suggests that these results almost invariably provide positive and significant coefficient estimates for R&D estimates, as do the coefficients reported for R&D expense for the pooled samples. They conclude (again from their footnote 8) that their '... results add further weight to the view that, on average, the capital markets treat research and development expenditures as investments in long-lived assets.'

Overall, the UK stream of work providing evidence on value-relevance has developed over time in three ways. First, the number of years has increased. Second, the models estimated have expanded to include more, or alternative, possible control variables. As a consequence of both these points, the power of the tests has increased. Third, the estimation methods have expanded to include more deflators. And, over the course of this development, the evidence in favour of the value relevance of R&D expense has become stronger.[5,6]

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[2] For the sake of comparability with Green et al. (1996), I use different notation from that found in Stark and Thomas (1998).

[3] Rather than the firm-specific cost of capital used in Green et al. (1996).

[4] Akbar and Stark (2003) used a number of different deflators because of the debate which exists as to the appropriate deflator to use in value-relevance studies (for a recent and comprehensive contribution to this debate, see Barth and Clinch, 2007).

[5] Shah et al. (2008a) also provide evidence which is consistent with the idea that market participants discriminate between sectors in the valuation of R&D activities.

[6] A different literature, based in (industrial) economics, relates R&D expenditures and other measures of innovation to the market values of firms. See Greenhalgh and Rogers (2006) for a relatively current example of this literature and a source of useful references. One key difference between this literature and that in accounting and finance is that the valuation models tend to be estimated in a form that is non-linear in the underlying variables, versus the assumed linearity in the accounting and finance literature. As a consequence, it is not clear that the results from this literature are strictly comparable with those drawn from the literature in accounting and finance.

Nonetheless, as indicated in the previous section, the value-relevance of R&D expense is unlikely to be purely a consequence of reporting that single number. Instead, the association between R&D expense and market prices emerges through a disclosure process, whether via the financial statements, or via other means, such as company and other meetings with analysts and institutional investors.

2.3. The use of discretion in capitalising development expenditure in the UK

Green et al. (1996: 201) argue that it was rare for capitalised R&D to appear in the balance sheets of UK listed firms. This conclusion was based upon the availability of data in Datastream for capitalised R&D for UK firms. Nonetheless, their conclusion was incorrect. As pointed out above, the revised version of SSAP 13, issued in 1989, did allow firms the discretion, but not the compulsion, to capitalise development expenditures under certain conditions (similar to those in the current IAS for the mandatory capitalising of certain development expenditures). Further, footnote disclosure was then available about the extent of the capitalisation of development expenditures. This footnote disclosure was rarely picked up by Datastream.

Oswald (2008) studies how the choice of capitalising versus expensing is associated with the value-relevance of book value and earnings.[7] He does so in a number of ways, but in describing the study I will concentrate on the aspect of the methodology that uses valuation models. He does so by comparing the explanatory power of two models of the firm. The first model is:

$$MV = \alpha_0 + \alpha_1 BV + \beta E + \varepsilon \qquad (4a)$$

The second model adjusts BV and E to reflect what they would have been if the alternative possible treatment of development expenditures had been adopted. Therefore, if the firm-year observation is for a firm that is an 'expenser', BV and E are estimated 'as if' some capitalisation had occurred. If the firm-year observation is for a firm that is a 'capitaliser', BV and E are estimated 'as if' R&D expenditures are expensed. Therefore, the second model estimated is:

$$MV = \alpha_0 + \alpha_1 BV^{adj} + \beta E^{adj} + \varepsilon \qquad (4b)$$

where:

BV^{adj} is adjusted book value; and
E^{adj} is adjusted earnings

Equations (4a) and (4b) are then compared for explanatory power for 'expensers' and 'capitalisers', the equations having been deflated by opening market value. Oswald's (2008) results suggest that firms' exercise of discretion over the accounting treatment of development expenditures are

consistent with the notion that firms acted to increase the value relevance of earnings and book value. More specifically, equation (4a) has more explanatory power relative to equation (4b) for both the 'expenser' and 'capitaliser' sub-samples.[8]

There are a number of points that can be raised with respect to this study. First, it supports the notion that the IAS, in removing discretion over the treatment of development expenditures, remove a useful way for firms to communicate information to the stock markets. Further, it accords with the evidence discussed in Wyatt (2008) for Australia. We might conclude that, although the IAS solution might be purer in accounting terms, purity of accounting might not be an absolute informational virtue. Further, Nixon (1997) argues that one reason why many UK firms did not use the discretion allowed to capitalise and amortise some of their qualifying development expenditures is that to so do requires a reasonably substantial amount of work, both in terms of identifying expenditures for different R&D projects and in terms of then applying the rules.

Second, evidence in Oswald (2008), nonetheless, suggests that this discretion was exercised by a relatively small number of UK firms, and featured in a relatively small number of the firm-year observations. Specifically, Oswald's (2008) sample features 3,229 firm-years drawn from the period 1996 to 2004. Of these, he identifies 468 'capitaliser' firm-years, approximately 14.5% of the sample. This is consistent with the evidence in Nixon (1997). As a consequence, the withdrawal of discretion, as a practical matter, might not have too drastic an effect on the efficient operation of the UK stock market.

Third, there are the limits on the interpretations that can be placed on studies such as that of Oswald (2008). Ignoring the processes identified above via which the market attributes value to R&D activities, in particular, the study has particular resonance if it is believed that investors only concentrate on book value and earnings – and ignore all the other information that typical financial statements for listed UK (or elsewhere) companies contain, both financial and non-financial. Nonetheless, in the light of evidence that, indeed, market values can, and should, be explained by rather more informational variables than book value and earnings (in particular, R&D expense), it is not at all clear that such a belief is rational. As a consequence, we might want to know more about the impact of the exercise of discretion on the information content of the totality of the affected

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[7] Oswald (2008) also studies the determinants of the choice between capitalisation and expensing.

[8] As with Akbar and Stark (2003), Oswald (2008) investigates the sensitivity of his results to alternative deflators. Generally, his results are not sensitive to the choice of deflator.

disclosures, not merely book value and earnings.

These observations, however, should not be interpreted as a criticism of Oswald (2008) alone. More, they should be interpreted as commenting on a general line of research in which, counter-factually, only certain accounting aggregates (e.g. book value and earnings) are apparently considered value-relevant in considering competing accounting treatments or changes in the value relevance of 'accounting' over time.

2.4. Is there evidence that R&D firms are mispriced in the UK?

Skinner (2008) asks whether there is any evidence that the form of accounting for R&D expenditures systematically misleads markets. Al-Horani et al. (2003) provide evidence on this issue. Underlying their investigation is the intuition that, if capital markets recognise the economic value of R&D activities, this recognition will be built into the market values of firms. As a consequence, *ceteris paribus*, the extent and value of R&D activities will be associated with the book-to-market (BM) ratio of firms, and the well-known BM effect, whereby high (low) BM firms tend to earn high (low) returns could be, at least partially, associated with R&D activities.

Al-Horani et al. (2003) use a sample of UK firms covering the years from 1990 to 1999. First, they split these firms up into those reporting R&D expense and those not. On average, just over 300 firms a year reported positive R&D expense. The R&D firms are then ranked by the ratio of R&D expense to firm equity market value (RD/ME) and formed into quintile portfolios. Al-Horani et al. (2003) observe that the lowest quintile R&D firms, as measured by RD/ME, have the lowest average annual returns, with average annual returns in-

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[9] Additional robustness tests suggest that it is credible to claim that there is both a BM and a RD/ME effect in the UK. There is little evidence, for the period studied, of a size (ME) effect.

[10] Al-Horani et al. (2003) also find that adding in a RD 'factor', related to the difference between returns for R&D firms and returns for non-R&D firms, improves the explanatory power of the Fama-French three factor model in the UK.

[11] The explanation is attributable to my colleagues Ala'a Al-Horani and Peter Pope as much as to me. It was contained in pre-publication versions of our paper but the referee was insistent that it be taken out if the paper was to be published.

[12] Hirschey and Weygandt (1985) would argue that this is the case.

[13] Skinner (2008) puts forward a further test for whether current accounting procedures have bad effects. He asks whether capital markets fail to provide the necessary funds to support high technology firms. In the UK, the stock markets have adapted to allow the listing of, for example, biotechnology firms with no history of profits. As a consequence, there is no clear-cut evidence that current accounting rules have interfered egregiously in the development of a UK biotechnology sector. Nonetheless, it is difficult to identify whether the correct firms, or the correct number of, firms have been listed.

creasing as the quintile portfolios move from low to high RD/ME. Nonetheless, firms reporting R&D expense do not automatically have higher returns than non-R&D firms – the average annual return for non-R&D firms is higher than the average annual returns for the lowest three quintiles. These results are similar to those observed by Chan et al. (2001) in the USA. Further, when standard Fama-MacBeth (1973) tests involving monthly cross-sectional regressions are performed, in which firm monthly returns are regressed on firm size (market value), BM and RD/ME and the average coefficient for each independent variable calculated and tested against the null hypothesis that it is zero, the *only* variable that has a significant cross-sectional relationship with returns over the period is RD/ME.

These results can be interpreted in a number of ways. First, they appear to support the Al-Horani et al. (2003) intuition that the relationship of returns to BM is related to R&D activities.[9,10] Second, either RD/ME captures a priced risk factor or the positive relationship between RD/ME and returns signals under-pricing in which, in particular, high RD/ME firms are the most under-priced – even if the lowest three quintiles of RD/ME firms have *lower* average returns than non-R&D firms. Is there a possible explanation, however, that can justify the assertion that the positive relationship is a result of risk?

Consider the following possibility.[11] First, R&D activity buys real (call) options – the opportunity to invest in the production of some new good or service. R&D activity is part of the new product development process. Second, for a fixed BM ratio, combined with a further assumption that R&D programmes are relatively steady and, hence, R&D capital can be adequately proxied by R&D expense,[12] what is the implication of RD/ME increasing? The implication is that each pound of R&D activity is being less highly valued by stock market participants. Given that R&D activity is being valued like a call option, the higher the RD/ME, the less 'in-the-money' are the real options 'purchased' as a consequence of the R&D activities. Options theory suggests that the less in-the-money an option is, the higher will be its expected return, resulting in, *ceteris paribus*, a positive relationship between RD/ME and expected returns. As a consequence, it can be argued that there is a risk story that can explain the positive relationship between RD/ME and returns.[13]

3. Accounting for other intangible assets

Other expenditures could give rise to intangible assets. As indicated in Wyatt (2008), these expenditures could include expenditures on marketing and, in particular, advertising, and human capital development. In the UK, the accounting treatment

is to immediately expense such expenditures, a treatment not altered by the advent of IAS. There are no requirements to disclose the amounts of these expenditures. There is relatively little UK evidence with respect to the views of analysts, company accountants, etc., about the accounting treatment of these expenditures. Nor is there much UK evidence that can even allude to the value-relevance of these expenditures.

There are two papers, however, that speak, directly and indirectly, to some of these issues with respect to advertising activities. First, Gray et al. (1990) survey the views of chief financial officers in the UK and the US on the net benefits of voluntary disclosure with respect to various items. The survey was conducted in 1984–1985 and one of the items considered was advertising expenditures.[14] With regard to the voluntary disclosure of advertising expenditures, Gray et al. (1990) state 'U.K. financial executives are significantly more worried about the net costs of providing information on the amount of advertising expenditure' relative to their counterparts in the US. Specifically, UK financial executives perceive net costs to such disclosures.[15]

Second, Shah et al. (2008b) provide evidence on the value relevance of estimates of major media advertising expenditures. The source of data for the estimates of advertising expenditures is

ACNielsen MEAL. ACNielsen MEAL are a major commercial supplier of estimated advertising expenditures, published quarterly. As a consequence, these estimates are available at a cost to business and market participants. The estimates are based upon surveying major media outlets for advertisements associated with products. These advertisements are then multiplied by estimated rates to get a cost *per* advertisement. The data is aggregated by product which can then be further aggregated from products to product groups to companies.

In testing for the value relevance of ACNielsen MEAL estimates of major media advertising expenditures, Shah et al. (2008b) extend the model of Akbar and Stark (2003), as described in equation (3) above, to include an advertising expenditure variable.[16] As an additional value relevance test, they examine whether advertising expenditures are able to help in the prediction of the subsequent year's residual income, once other variables are controlled for (lagged residual income, lagged R&D expenditures, and lagged book value). Their conclusions are that major media advertising expenditures are value relevant for non-manufacturing firms, but not for manufacturing firms. They conclude, with respect to the UK, that their results 'could be of interest to ... policy-makers ... because the results suggest that the provision of major media advertising information could be useful to market participants, in the sense that estimates of these expenditures can help explain variations in market values, and help forecast a measure of earnings, for a class of firms. As a consequence, one element of a case for their disclosure could be brought – some benefits seem to exist, to offset any associated costs.'[17]

Summarising, for advertising expenditures that might give rise to intangible assets, therefore, there is some evidence that, for a limited class of expenditures (major media), and for a limited set of firms, they are value-relevant. It is not clear that all advertising expenditures, even major media, lead to the acquisition of an intangible asset. As a consequence, there *could* be a case for the disclosure of such expenditures, or a class of such expenditures, subject to an assessment of the costs (proprietary and other) of such disclosure.

Nonetheless, given the views previously expressed by UK financial executives reported in Gray et al. (1990), there might well be resistance to such disclosure. It is worth noting in this regard that, however, judging by the evidence from Hope and Gray (1982) and Nixon (1997), the views of industry appeared to have changed over time with respect to the disclosure of R&D amounts and voluntary disclosure. As a consequence, there might be less resistance now to the disclosure of (certain types of) advertising expenditures than over 20 years ago.

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[14] As pointed out in Shah et al. (2008b), before 1994 'the Securities and Exchange Commission (SEC) required industrial and commercial firms to supply a supplementary income statement information schedule, which contained, as one of its items, advertising expenses. In 1994, however, the SEC issued FR44, which eliminated the requirement to furnish this schedule. As a consequence, FR44 effectively overturned the SOP 93-7 requirement for separate disclosure of advertising expenses for industrial and commercial firms. As a consequence, the disclosure of advertising expense in the US has been voluntary since 1994 for these firms.' As a consequence, it is not totally clear that the disclosure of advertising expenditure was *voluntary* in the US during the period of the survey.

[15] Simpson (2008) studies the consequences of the change in the advertising expenditure disclosure requirements for US industrial and commercial firms. Her results identify patterns of voluntary disclosure behaviour in which firms in industries where advertising expenditures by one firm benefited their rivals before 1994 are less likely to disclose advertising costs voluntarily after 1994. Also, firms, which experienced valuation benefits from advertising before 1994 are more likely to voluntarily disclose afterwards. Her results also indicate that investors in the US markets treat voluntarily disclosed advertising expenses as if they are investment expenditures.

[16] They do not include the 'other information' variable from equation (3), however.

[17] Kallapur and Kwan (2004) investigate the value relevance of brand assets recognised in UK balance sheets as a consequence of acquisitions. They find that the recognised brand assets are value-relevant. Nonetheless, they also provide evidence that the valuations placed on recognised brand assets by UK firms are subject to contracting incentives caused not only by the conventional source of debt contracts but also by London Stock Exchange rules relating to circumstances under which UK companies can undertake acquisitions without seeking the approval of their shareholders.

4. Accounting policy implications for recognition and disclosure

Similar to the views of Skinner (2008), there appears to be little demand, and little evidence, for a widespread reappraisal of accounting policy with respect to allowing the capitalising of some or all of R&D expenditures in the UK. Firm representatives do not believe that there are systematic and widespread mis-pricing effects for firms with R&D activities and the empirical evidence supports this. If anything, the evidence suggests that IAS standards should be changed to allow the discretion, previously allowed under SSAP 13, as to whether or not to capitalise qualifying development expenditures. Even there, however, the consequences of disallowing discretion are unlikely to be large with respect to the efficient operations of stock markets although, as suggested by Nixon (1997), there might be some cost implications for company accountants.

Penman (2006) points out that, for firms in a steady state (even if growing), the capitalise/amortise *versus* immediate expensing issue with respect to expenditures that might give rise to intangible assets is not automatically of any concern to market participants seeking information relevant to valuing the firm. For such firms, the accounting treatment (e.g. immediate expensing) of these expenditures does not mislead market participants into serious forecasting mistakes with respect to the future potential of firms. Further this idea is not restricted to expenditures that are disclosed.[18]

This raises three issues. One is whether the capitalise/amortise *versus* immediate expensing issue could be an issue for non-steady state firms. The second is whether, for these firms, there might be a need to separately disclose expenditures on items likely to give rise to intangible assets. The third is whether there are sufficient safeguards in place with respect to voluntary disclosure to ensure that such disclosures can be relied upon. If they cannot be relied upon, as Skinner (2008) suggests, there could be a role for some kind of regulation by accounting bodies or the state.

For R&D, however, it seems accepted in the UK that voluntary disclosure outside of financial statements, in addition to the disclosure of R&D expenditures, is necessary in order that stock markets can put appropriate values on firms' R&D activities. One role for the disclosure of the amount of R&D expenditures could be that it provides a 'reality check' on claims made by companies' managements with respect to the future benefits arising from such expenditures. Nonetheless, the appropriate valuation of R&D expenditures, whether for firms in a steady state or a non-steady state, in general does not seem to require the capitalising and subsequent amortising of some or all of R&D expenditures.

One would not want to be too sanguine about the incentives for reliable disclosure, however. In particular, the UK biotechnology industry has been the subject of a number of disclosure 'incidents' in recent years.[19] Whether such incidents were the result of deliberate attempts to defraud or an unfortunate degree of over-enthusiasm about future potential is not clear. Arguably, however, such incidents did give rise to concerns that lead the BioIndustry Association in the UK to produce its 'Best Practice Guidance on Financial and Corporate Communications'.[20] Presumably, this move was motivated by potential spillover effects for the whole industry of disclosure 'incidents'. Further, surveying the Regulatory News Service reveals little evidence of bad news concerning drug trials which, given the perceived riskiness of the drug discovery process, could be regarded as surprising. As a consequence, as Skinner (2008) suggests, there could be a role for voluntary disclosure guidelines.

The situation could be different for other categories of expenditure, however. As Penman (2006) indicates, the lack of disclosure of advertising expenditures will not automatically cause difficulties for the valuation of companies. Nonetheless, the assumption of firms being in a steady state for forecasting purposes covers up many implicit assumptions about the built-in relationships between advertising activities, and their extent, and subsequent sales, and their extent. It is difficult to see how, without the *disclosure* of advertising expenditures, market participants can assess the realism of their revenue projections and their dependence on marketing and advertising activities. Similar arguments could be made, for example, about expenditures on the development of a well-educated and well-trained work force.

Note, however, that most advertising activities, by their nature, are not meant to be secret. In other words, market participants can observe them to one extent or another, depending upon the good or service involved. If they cannot, then information intermediaries such as ACNielsen MEAL can provide estimates of some types of expenditure at a cost. As a consequence, it could be argued that there are alternative, if imperfect and costly, means of getting information on advertising activities,

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[18] As pointed out by Skinner (2008), Penman (2007) illustrates this basic point via a valuation case study using Coca-Cola. He shows that it was perfectly possible to apply forecasting methods that valued Coca-Cola pretty accurately despite the fact that advertising expenditures are expensed and, as a consequence, what is undoubtedly a major intangible asset is omitted from Coca-Cola's balance sheet.

[19] Joos (2003) suggests that such problems are not unique to the UK but have also occurred in the USA.

[20] http://www.bioindustry.org/biodocuments/BestPractice Guidance/BestPracticeGuidance.pdf

and their extent. The market participant does not necessarily start at ground zero with regards to the effects of corporate advertising. It is not clear that this could be said about other categories of expenditures that have the potential to create intangible assets, however.

Nonetheless, to be set against such arguments in favour of disclosure are ones that speak to the exact definition of such activities and, as a consequence, expenditures related to them. Further, there are also the normal issues of (proprietary) costs associated with additional disclosure. In the context of the USA, Simpson (2008) provides evidence on proprietary costs by studying the behaviour of firms before and after the SEC dropping the requirement for the mandatory disclosure of advertising expenditures in 1994. Her study does suggest the existence of proprietary costs associated with levels of competition and competitive structure in sectors.

In general, Basu and Waymire (2008), Skinner (2008), Wyatt (2008) and Ittner (2008) emphasise that the creation of intangible assets in the context of fairly complex business models and processes. Further, these business models and processes, whilst possibly possessing some degree of homogeneity within sectors and across sectors, are also likely to involve considerable degrees of heterogeneity. This gives rise to some concern about the possibilities for the formal regulation of voluntary disclosure, and the level of detail that could be involved. Could a common regulatory framework, for example, identify a set of performance indicators that would be relevant for *all* firms in helping market participants in understanding the link between current activities in creating intangible assets and future performance?

There are two aspects to answering this question. First, does such a set of performance indicators exist? Second, could regulators identify them? The evidence surveyed in Ittner (2008) suggests that (perhaps surprisingly, perhaps not) businesses have difficulty in identifying such performance indicators themselves. Further, there is no indication that, for those firms that think they have a firm handle on performance indicators that help them implement their business models and processes, the performance measures are common across such firms.

These views partially echo the work of Holland (2001, 2003, 2005) concerning UK company managers and fund managers. The evidence in Holland

(2001, 2003, 2005) suggests that, in particular, communication between companies and fund managers about the creation of intangible assets is difficult, even when taking place in private, regularly scheduled, meetings between a fund manager and company management. In discussing intangible assets, these meetings tend to emphasise qualitative, rather than quantitative, information. But, his evidence emphasises that, notwithstanding the fact that, for example, R&D and advertising activities can be reflected in firm market values, fund managers, as major players in the UK stock market, do have difficulty in understanding corporate intangible asset creation processes. This lack of understanding could give rise to opportunistic behaviour.

The evidence suggests answers to both the questions posed above. First, it is not clear that a set of performance indicators, relevant for all firms, exists. As a consequence, sets of performance measures might well have to be created for individual sectors and/or business models and processes. Second, if businesses find it difficult to come up with appropriate sets of firm-specific measures, and major shareholders (i.e. fund managers) find it difficult to understand the value creation process for intangible assets in individual firms, is it likely that regulators can somehow do firms' jobs for them, in identifying relevant performance indicators, and help ameliorate the communication difficulties between firm managers and major shareholders? Nonetheless, the lack of understanding of major shareholders concerning the value creation process for intangible assets could give rise to opportunistic behaviour.

As a consequence, Skinner's (2008) suggestion that the regulatory framework would likely be in the form of a broad set of guidelines to help businesses in how to communicate information relevant to the links between various types of expenditure designed to increase performance in the future seems sensible. One possibility is that a 'best practice' framework for the disclosure of information concerning intangible assets could operate within a 'comply or explain' mode, as with the Combined Code.[21]

Nonetheless, in the UK, the Financial Services Authority already publishes guidance on the disclosure of price sensitive information.[22] As a consequence, any such additional guidelines would have to be incrementally useful relative to the existing guidance. That such additional guidance could be useful is indicated by the UK BioIndustry Association publication referred to above.[23] But, the existence of such sector specific guidance also provides another benchmark against which broad regulatory guidelines should add value. Put another way, there already exist guidelines in the UK about the voluntary disclosure of corporate infor-

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[21] This point is attributable to William Forbes.

[22] http://www.fsa.gov.uk/pubs/ukla/GU-0796.pdf

[23] Further, if a sector shares enough common interests to create an industry association, there might be incentives to create sector-specific self-regulation mechanisms with respect to activities with potential negative spillovers (e.g. overly opportunistic disclosures).

mation, including those produced by industry associations. The key question then is – what additional value added would be provided by a broad set of guidelines in the UK?

5. Conclusions

It would be difficult, based upon the UK evidence available, to say that the current combinations of various (relatively similar) accounting regulations *plus* mandatory/voluntary disclosure mechanisms (including the obligation to disclose price sensitive information) lead to enormous inefficiencies in the UK, or elsewhere. Further, and more specifically, not allowing the capitalisation of many intangibles does not seem to do inordinate harm. Nonetheless, there could be a case for the explicit disclosure of more categories of expenditures involving intangibles to aid in the forecasting of future prospects – but proprietary costs would need to be explicitly considered, and the difficulties of definition grappled with.

It is also possible that there is a role for accounting policy-makers in regulating, or providing guidelines on, the voluntary disclosure of information about expenditures and their association with future prospects. Nonetheless, expenditures on intangibles are thought to be intertwined with business models and processes that produce difficulties in identifying particular items of financial or non-financial information that are unequivocally associated with future performance the disclosure of which, as a consequence, *could* be useful to investors and would not involve 'excessive' proprietary costs. As a consequence, regulating what *ought* to be disclosed concerning intangibles would be difficult. At best, there could be a role for regulators in establishing frameworks to guide voluntary disclosures, as opposed to specifying the content of such disclosures.

One difficulty in developing such guidelines in the UK, however, is that such guidelines already exist, whether through the Financial Services Authority or industry associations. As a consequence, further guidelines would have to consider what is to be added to the already existing ones.

References

ASC (1975). ED 14 – Accounting for Research and Development, January 1975: Accounting Standards Committee, UK.

ASC (1976). ED 17 – Accounting for Research and Development, April 1976. Accounting Standards Committee, UK.

ASC (1977). SSAP 13 – Accounting for Research and Development, December 1977: Accounting Standards Committee, UK.

Akbar, S. and Stark, A.W. (2003). 'Deflators, Net Shareholder Cash Flows, Dividends, Capital Contributions and Estimated Models of Corporate Valuation'. *Journal of Business Finance and Accounting*, 30 (9–10): 1211–1233.

Al-Horani, A., Pope, P.F. and Stark, A.W. (2003). 'Research and Development Activity and Expected Returns in the United Kingdom'. *European Finance Review* (now *Review of Finance*), 7: 27–46.

Barth, M.E. and Clinch, G. (2007). 'Scale Effects in Capital Markets-Based Accounting Research'. Unpublished working paper.

Basu, S. and Waymire, G. (2008). 'Has the importance of intangibles really grown? And if so, why?' *Accounting and Business Research*, 38 (3): 171–190 Special Issue – International Accounting Policy Forum 2008. This issue.

Chan, L.K.C., Lakonishok, J. and Sougiannis, T. (2001). 'The Stock Market Valuation of Research and Development Expenditures'. *Journal of Finance*, 56: 2431–2456.

Fama, E.F. and MacBeth, J. (1973). 'Risk, Return, and Equilibrium: Empirical Tests'. *Journal of Political Economy*, 81: 607–636.

Goodacre, A. and McGrath, J. (1997). 'An Experimental Study of Analysts' Reactions to Corporate R&D Expenditures'. *British Accounting Review*, 29: 155–179.

Gray, S.J., Radebaugh, L.H. and Roberts, C.B. (1990). 'International Perspectives on Cost Constraints on Voluntary Information Disclosures: a Comparative Study of U.K. and U.S. Multinationals'. *Journal of International Business Studies*, 21: 597–622.

Green, J.P., Stark, A.W. and Thomas, H.M. (1996). 'UK Evidence on the Market Valuation of Research and Development Expenditures', *Journal of Business Finance and Accounting*, 23 (2): 191–216.

Greenhalgh, C. and Rogers, M. (2006). 'The Value of Innovation: The Interaction of Competition, R&D and IP'. *Research Policy*, 35: 562–580.

Hirschey, M. and Weygandt, J.J. (1985). 'Amortization Policy for Advertising and Research and Development Expenditures'. *Journal of Accounting Research*, 23: 326–335.

Holland, J. (2001). 'Financial Institutions, Intangibles and Corporate Governance'. *Accounting, Auditing and Accountability Journal*, 14: 497–529.

Holland, J. (2003). 'Intellectual Capital and the Capital Market – Organisation and Competence'. *Accounting, Auditing and Accountability Journal*, 16: 39–48.

Holland, J. (2005). 'Financial Institutions, Intangibles and Corporate Governance'. *Accounting and Business Research*, 35: 249–267.

Hope, T. and Gray, R. (1982). 'Power and Policy Making: the Development of an R&D Standard'. *Journal of Business Finance and Accounting*, 9(4): 531–558.

Ittner, C.D. (2008). 'Does Measuring Intangibles for Management Purposes Improve Performance? A Review of the Evidence'. *Accounting and Business Research*, 38 (3): 261–272 Special Issue – International Accounting Policy Forum 2008. This issue.

Joos, P. (2003). 'The Usefulness of Biotechnology Firms' Drug Development Status in the Evaluation of Research and Development Costs'. *Journal of Accounting, Auditing and Finance*, 18: 197–205.

Kallapur, S. and Kwan, S. (2004). 'The Value Relevance and Reliability of Brand Assets Recognized by U.K. Firms'. *The Accounting Review*, 78: 151–172.

Nixon, B. (1997). 'The Accounting Treatment of Research and Development Expenditure: Views of UK Company Accountants'. *European Accounting Review*, 6: 265–277.

Ohlson, J.A. (1989). 'Accounting Earnings, Book Value, and Dividends: the Theory of the Clean Surplus Equation'. Unpublished Working Paper, Columbia University.

Oswald, D. (2008). 'The Determinants and the Value

Relevance of the Choice of Accounting for Research and Development Expenditures in the United Kingdom'. *Journal of Business Finance and Accounting.* Forthcoming.

Penman, S.H. (2006). *Financial Statement Analysis and Security Valuation.* New York: McGraw-Hill.

Penman, S.H. (2007). 'Financial Reporting Quality: Is Fair Value a Plus or a Minus?' *Accounting and Business Research,* Special Issue – International Accounting Policy Forum 2007: 33–44.

Shah, S., Stark, A. W. and Akbar, S. (2008a). 'Firm Size, Sector and Market Valuation of R&D Expenditures'. *Applied Financial Economics Letters.* Forthcoming.

Shah, S., Stark, A.W. and Akbar, S. (2008b). 'The Value Relevance Of Major Media Advertising Expenditures: Some UK Evidence'. Unpublished working paper.

Simpson, A.V. (2008). 'Voluntary Disclosure of Advertising Expenditures'. *Journal of Accounting,*

Auditing and Finance. Forthcoming.

Skinner, D.J. (2008). 'Accounting for Intangibles – a Critical Review of Policy Recommendations'. *Accounting and Business Research,* 38 (3): 191–204 Special Issue – International Accounting Policy Forum 2008. This issue.

Stoneman, P. and Toivanen, O. (2001). 'The Impact of Revised Recommended Accounting Practices on R&D Reporting by UK Firms'. *International Journal of the Economics of Business,* 8: 123–136.

Stark, A.W. and Thomas, H.M. (1998). 'On the Empirical Relationship between Market Value and Residual Income in the U.K.'. *Management Accounting Research,* 9: 445–460.

Wyatt, A. (2008). 'What Financial and Non-Financial Information on Intangibles is Value-Relevant? A Review of the Evidence'. *Accounting and Business Research,* 38 (3): 217–256 Special Issue – International Accounting Policy Forum 2008. This issue.

Discussion of 'Intangibles and research – an overview with a specific focus on the UK'

Alan Mackay*

I have been asked to give a practitioner's perspective. This is not an accounting practitioner's perspective; if anything, it is an investment practitioner's perspective. It cuts across all of the issues that you have been discussing. I will try to do that quite quickly, with just two or three points.

As background to my observations, I lead 3i's global healthcare practice so I see a lot of the information that Glaxo sees but at a much, much earlier stage, particularly in our venture capital business where I see the creation of intangibles.

I also focus particularly on public companies. I invest in, and sit on the boards of, established companies. We have a business called Quoted Private Equity, which is a strange label, but through it I see the issues that we all wrestle with in the public company disclosure domain.

At 3i I have nurtured for a decade now our interest in central and eastern Europe, where we have quite an active venture, with offices in Warsaw, Prague, Budapest and, most recently in Bucharest. It is one of the few places where with intangibles you could go negative and put a bracket around them. I do not know how often you discuss political risk or indeed the organised crime risk, but I see it very much in the flesh.

That outlines my role at 3i. I shall weave some of those perspectives into what I say. I should also say that I am not an accountant. I am a lawyer. I studied law in Scotland. I failed what they called accounting and tax law, if you can imagine such a thing, and at the same time, in the same year, won a prize in jurisprudence, which is the theory of law, because I'd written a little mini-thesis which lauded accounting and tax law as examples of good law! So I have opinions on everything, but do not know very much about the detail. I thought I'd just share that with you!

Looking forward, I am going straight from here to New York to a meeting which will negotiate this evening (New York time) from 8 p.m. through to 11 p.m., which is about 4 a.m. London time, on a particular transaction which everyone who is in-

volved wants to get closed before Christmas. I shall return to that later as it is relevant to intangibles.

In my investment practitioner's perspective I should like to share with you three specific observations.

First, I have been in the investment business for some time. My very first day at 3i was Black Monday in 1987, which was an interesting place to start. Over the 20 years since then I have seen some incredible changes in perspectives from an investor's point of view. And it really has changed.

When I was first investing through 3i, as an equity investor taking risk capital investments in companies, we used to prepare an asset cover schedule for every investment that we made. Banks were worried about realisable values in the event of insolvency and liquidation. As an equity investor we used to prepare asset cover schedules as well, to see, after the debt was recovered, what would be available by way of distributions to the shareholders. We had to offset all the prior claims of all the preferred creditors. However, we spent a great deal of time in a great deal of detail going through the balance sheets of the companies in which we were about to take risk investments.

Fast forward to today, 2007, and particularly in healthcare – but also in media and some other sectors – the investment industry will apply multiples of EBITDA of 15, 16 or 17, for companies. There is certainly no asset cover on the equity. On the debt, there is only partial cover on any basis; either the going concern or the wind-up basis. On top of that, there is a whole range of amplifying risks like the roll-up of interest or PIK (payment-in-kind) notes where interest costs on debt are not paid but are accumulated as a charge. When I think back on it, the whole mindset of investment has shifted dramatically so that items which were intangible and which were not realisable assets and were not physical corporeal assets were unacceptable 20 years ago but are absolutely accepted now. That carries with it a whole range of knock-on effects in the way that people think and account for their investments and the valuation of assets.

I should also just highlight that in getting from 1987 to 2007 we obviously went via the 1990s,

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and particularly the late 1990s. I see my colleagues nodding, with their painful memory for our industry. This is not specific to 3i; things did go absolutely to excess in that dot.com bubble. We had, for all the talk of portfolio effect, to equalise some of the uncertainties around intangibles and some of the judgment calls on the less quantifiably measurable things. We had at 3i something like 3,000 investments, marking everything by best judgment, putting a value on each one of those, item by item, and being a little bit concerned at the over-value that external events were forcing. Yet 3i itself, across 3,000 assets, as a FTSE 100 company was trading at a 60% premium to its best judgment net asset value, as other people tried to look through that and make judgments about how conservative 3i was being.

I would say that over time we have gone from the '70s and '80s where investment perceptions around assets with intangibles were irrelevant and it was all about hard assets, and then we've gone through some craziness. And we have come back recently, over the last five or six years, to a more conservative view as an investment industry, whether it involves private equity or public equity views on intangibles. Let's just keep a lid on the exuberance!

The second point I'd make as an investment perspective is to share with you how we actually do in practice value things, particularly the venture capital industry globally.

A couple of hundred billion dollars a year move around in that marketplace. This amount is applied by people striking a deal to invest in one idea or another: 'We will give you $30m to do this and we will have 30% of the equity in your company.'

The British Venture Capital Association (BVCA), or the European equivalent (EVCA), or the American NVCA, all say the same on intangibles – so while technically the International Accounting Standard IAS 38 or the UK Statement of Standard Accounting Practice SSAP 13, or indeed International Financial Reporting Standards generally, may all disagree about recognition and capitalising or expensing – the investment industry says, 'if there is any conflict between the way we think about valuing something and any of those rules, whichever standard is applicable, then the standard dominates, and our subjective view subordinates.' Yet in reality I do not see that. I cannot join this up. So for me in reality there is disconnect between net asset value (NAV) and fair market value because if, in my example, we put $30m into an idea, a new drug or launch of a new media brand, and we take 30% of the equity, with an imputed enterprise value of $100m for this thing, then the whole venture capital industry for some time will hold the $30m investment and account for it as a $30m investment despite the fact that

that $30m is being spent and burned away and losses are being incurred, and the NAV of the entity is rocketing down. And then, at some point, it will look for an event, or some kind of rationale, upon which to pin a new value. But there is quite a disconnect for quite some time between the entry imputed valuation and what is happening in the real world with that particular company. And again, I am not technical enough to rationalise and re-join that disconnect. But I would remark, from what I heard today, that it is there and it is for me a quirky little thing.

Again, the message I would say is that the investment industry, as a whole, is becoming slightly more conservative over the last five or six years.

Yet whatever way you look at it, it's not a NAV-driven mindset in private equity, or indeed in the investment industry as a whole – it has moved away from the most conservative perspective. It has at times been a bit ludicrous, yet I would say actually the zeitgeist, the shift in the last five years across most of the investment mindsets, is to something slightly more conservative. If I try to explain that – and this will be my third and last perspective to share – the most important practitioner insight I would leave is that, from an investment mindset, all this debate around intangibles and valuation, actually boils down to entry, which means the time that you invest, and exit, which means what you think you are going to get for your asset when you realise.

Again, this is not a technical thing, but philosophically all the going concern mindset around expensing assets, about amortising them, or valuation uplifts or adjustments, really does not apply in investment industries. Absolutely everything feeds off entry and exit. And again, looking back to where I'm going in the next 12 hours, we are going to try to close an investment. It's an asset in which we, 3i, are investing. There are two other new institutions wanting to invest in that asset. The value range that we have been debating is quite huge, between $370m and $460m. In reality it is much narrower; it's around $400–420m. Tonight, by 11 p.m. New York time, 4 a.m. here, we will have resolved that and will have shaken hands on it.

However, whatever we shake hands on as the figure for that company will have many knock-on impacts. It would be impossible for me to articulate that to you in the technical language of intangibles but it will have a very direct impact in the accounting for at least ten entities: for 3i and the other two current investors; for the two incoming investors; for the company itself in which everyone is investing; and indeed all the way back through the limited partners and the investors in those funds; and goodness knows how many pensioners and life insurance policy-holders behind.

This does not give you any answers, but as a

perspective the investment industry is preoccupied by entry to exit, and then will justify that as a judgment call over three years, five years or ten years, whatever the holding period is. The actual essence of the intangible and how you build up the argumentation, frankly is not prevalent in the judgment call around how these values are set. I will leave it at that.

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If you have any problems sending a Word file as an attachment to an e-mail, please send an e-mail to the above address explaining the difficulty.

Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the paper shares data with another paper, an electronic copy of the other paper must be provided. Authors of accepted papers will also be asked to assign exclusive copyright to the publishers.

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Accounting Standards Steering Committee (1975). *The Corporate Report*. London: ASC.
Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25(3): 208–218.
Watts, R.L. and Zimmerman, J.L. (1986). Positive Accounting Theory. Englewood Cliffs, NJ: Prentice Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.